Roswell Slides Fiasco | Wikipedia Skepticism | Haunting Handprints | Dawkins & Collins | Challenge to Heartland

Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

Vol. 39 No. 5 | September/October 2015

THE DAEDALUS SEA SERPENT SOLVED

Reason *for* Change

CONFERENCE SPECIAL:
Quacks, GMOs, Climate, Dawkins, Science, and God

'Post-Materialist' Science? A Smokescreen for Woo

Science and the Pope's Encyclical

Evidence-Free Enterprise: NCCAM's Business Grants

The Future of CFI

Published by the Center for Inquiry in association with the Committee for Skeptical Inquiry

CSI
Committee for Skeptical Inquiry

Ronald A. Lindsay, President and CEO
Barry Karr, Executive Director
Joe Nickell, Senior Research Fellow
Massimo Polidoro, Research Fellow
Benjamin Radford, Research Fellow
Richard Wiseman, Research Fellow

A PROGRAM OF THE
CENTER FOR INQUIRY

Fellows

www.csicop.org

James E. Alcock*, psychologist, York Univ., Toronto
Marcia Angell, MD, former editor-in-chief, *New England Journal of Medicine*
Kimball Atwood IV, MD, physician; author; Newton, MA
Stephen Barrett, MD, psychiatrist; author; consumer advocate, Allentown, PA
Willem Betz, MD, professor of medicine, Univ. of Brussels
Irving Biederman, psychologist, Univ. of Southern CA
Susan Blackmore, visiting lecturer, Univ. of the West of England, Bristol
Sandra Blakeslee, science writer; author; *New York Times* science correspondent
Mark Boslough, physicist, Sandia National Laboratories, Albuquerque, NM
Henri Broch, physicist, Univ. of Nice, France
Jan Harold Brunvand, folklorist; professor emeritus of English, Univ. of Utah
Mario Bunge, philosopher, McGill Univ., Montreal
Robert T. Carroll, emeritus professor of philosophy, Sacramento City College; writer
Sean B. Carroll, molecular geneticist; vice president for science education, Howard Hughes Medical Institute, Madison, WI
Thomas R. Casten, energy expert; founder and chairman, Recycled Energy Development, Westmont, IL
John R. Cole, anthropologist; editor, National Center for Science Education
K.C. Cole, science writer; author; professor, Univ. of Southern California's Annenberg School of Journalism
Frederick Crews, literary and cultural critic; professor emeritus of English, Univ. of CA, Berkeley
Richard Dawkins, zoologist, Oxford Univ.
Geoffrey Dean, technical editor, Perth, Australia
Cornelis de Jager, professor of astrophysics, Univ. of Utrecht, the Netherlands
Daniel C. Dennett, Austin B. Fletcher Professor of Philosophy and director of Center for Cognitive Studies, Tufts Univ.
Ann Druyan, writer and producer; CEO, Cosmos Studios, Ithaca, NY
Sanal Edamaruku, president, Indian Rationalist Association and Rationalist International
Edzard Ernst, professor, Complementary Medicine, Peninsula Medical School, Universities of Exeter and Plymouth, Exeter, UK
Kenneth Feder, professor of anthropology, Central Connecticut State Univ.
Barbara Forrest, professor of philosophy, SE Louisiana Univ.
Andrew Fraknoi, astronomer, Foothill College, Los Altos Hills, CA
Kendrick Frazier*, science writer; editor, Skeptical Inquirer
Christopher C. French, professor, Department of Psychology, and head of the Anomalistic Psychology Research Unit, Goldsmiths College, Univ. of London
Luigi Garlaschelli, chemist, Università di Pavia (Italy); research fellow of CICAP, the Italian skeptics group
Maryanne Garry, professor, School of Psychology, Victoria Univ. of Wellington, New Zealand
Murray Gell-Mann, professor of physics, Santa Fe Institute; Nobel laureate
Thomas Gilovich, psychologist, Cornell Univ.
David H. Gorski, cancer surgeon and researcher at Barbara Ann Karmanos Cancer Institute and chief of breast surgery section, Wayne State University School of Medicine.
Wendy M. Grossman, writer; founder and first editor, *The Skeptic* magazine (UK)
Susan Haack, Cooper Senior Scholar in Arts and Sciences, professor of philosophy and professor of Law, Univ. of Miami
Harriet Hall*, MD, physician; investigator, Puyallup, WA
David J. Helfand, professor of astronomy, Columbia Univ.
Terence M. Hines, prof. of psychology, Pace Univ., Pleasantville, NY.
Douglas R. Hofstadter, professor of human understanding and cognitive science, Indiana Univ.
Gerald Holton, Mallinckrodt Professor of Physics and professor of history of science, Harvard Univ.
Ray Hyman*, psychologist, Univ. of Oregon
Stuart D. Jordan, NASA astrophysicist emeritus; science advisor to Center for Inquiry Office of Public Policy, Washington, DC
Barry Karr, executive director, Committee for Skeptical Inquiry, Amherst, New York
Lawrence M. Krauss, foundation professor, School of Earth and Space Exploration and Physics Dept.; director, Origins Initiative, Arizona State Univ.
Harry Kroto, professor of chemistry and biochemistry, Florida State Univ.; Nobel laureate
Edwin C. Krupp, astronomer; director, Griffith Observatory, Los Angeles, CA
Lawrence Kusche, science writer
Leon Lederman, emeritus director, Fermilab; Nobel laureate in physics
Scott O. Lilienfeld*, psychologist, Emory Univ., Atlanta, GA
Lin Zixin, former editor, *Science and Technology Daily* (China)
Jere Lipps, Museum of Paleontology, Univ. of CA, Berkeley
Elizabeth Loftus*, professor of psychology, Univ. of CA, Irvine
David Marks, psychologist, City Univ., London
Mario Mendez-Acosta, journalist and science writer, Mexico City
Kenneth R. Miller, professor of biology, Brown Univ.
Marvin Minsky, professor of media arts and sciences, M.I.T.
David Morrison, space scientist, NASA Ames Research Center
Richard A. Muller, professor of physics, Univ. of CA, Berkeley
Joe Nickell, senior research fellow, CSI
Jan Willem Nienhuys, mathematician, Waalre, The Netherlands
Lee Nisbet, philosopher, Medaille College
Steven Novella*, MD, assistant professor of neurology, Yale Univ. School of Medicine
Bill Nye, science educator and television host, Nye Labs
James E. Oberg, science writer
Irmgard Oepen, professor of medicine (retired), Marburg, Germany
Loren Pankratz, psychologist, Oregon Health Sciences Univ.
Robert L. Park, professor of physics, Univ. of Maryland
Jay M. Pasachoff, Field Memorial Professor of Astronomy and director of the Hopkins Observatory, Williams College
John Paulos, mathematician, Temple Univ.
Clifford A. Pickover, scientist, author, editor, IBM T.J. Watson Research Center.
Massimo Pigliucci, professor of philosophy, City Univ. of New York—Lehman College
Steven Pinker, cognitive scientist, Harvard Univ.
Massimo Polidoro, science writer; author; executive director of CICAP, Italy
Anthony R. Pratkanis, professor of psychology, Univ. of CA, Santa Cruz
Benjamin Radford, investigator; research fellow, Committee for Skeptical Inquiry
James "The Amazing" Randi, magician; CSICOP founding member; founder, James Randi Educational Foundation
Milton Rosenberg, psychologist, Univ. of Chicago
Amardeo Sarma*, chairman, GWUP, Germany
Richard Saunders, president, Australian Skeptics; educator; investigator; podcaster; Sydney, Australia
Joe Schwarcz, director, McGill Office for Science and Society
Eugenie C. Scott*, physical anthropologist; chair, advisory council , National Center for Science Education
Robert Sheaffer, science writer
Seth Shostak, senior astronomer, SETI Institute, Mountain View, CA
Simon Singh, science writer; broadcaster; UK
Dick Smith, entrepreneur, publisher, aviator, adventurer, Terrey Hills, N.S.W., Australia
Keith E. Stanovich, cognitive psychologist; professor of human development and applied psychology, Univ. of Toronto
Karen Stollznow*, linguist; skeptical investigator; writer; podcaster
Jill Cornell Tarter, astronomer, SETI Institute, Mountain View, CA
Carol Tavris, psychologist and author, Los Angeles, CA
David E. Thomas*, physicist and mathematician, Socorro, NM
Neil deGrasse Tyson, astrophysicist and director, Hayden Planetarium, New York City
Indre Viskontas, cognitive neuroscientist, tv and podcast host, and opera singer, San Francisco, CA
Marilyn vos Savant, *Parade* magazine contributing editor
Steven Weinberg, professor of physics and astronomy, Univ. of Texas at Austin; Nobel laureate
E.O. Wilson, Univ. professor emeritus, organismic and evolutionary biology, Harvard Univ.
Richard Wiseman, psychologist, Univ. of Hertfordshire, England
Benjamin Wolozin, professor, Department of Pharmacology, Boston Univ. School of Medicine
Marvin Zelen, statistician, Harvard Univ.

* Member, CSI Executive Council (Affiliations given for identification only.)

The Skeptical Inquirer (ISSN 0194-6730) is published bimonthly by the Center for Inquiry in association with the Committee for Skeptical Inquiry, P.O. Box 703, Amherst, NY 14226. Printed in U.S.A. Periodicals postage paid at Buffalo, NY, and at additional mailing offices. Subscription prices: one year (six issues), $35; two years, $60; three years, $84; single issue, $5.99. Canadian and foreign orders: Payment in U.S. funds drawn on a U.S. bank must accompany orders; please add US$10 per year for shipping. Canadian and foreign customers are encouraged to use Visa or MasterCard.

Inquiries from the media and the public about the work of the Committee should be made to Barry Karr, Executive Director, CSI, P.O. Box 703, Amherst, NY 14226-0703. Tel.: 716-636-1425. Fax: 716-636-1733. Email: bkarr@centerforinquiry.net.

Manuscripts, letters, books for review, and editorial inquiries should be sent to Kendrick Frazier, Editor, Skeptical Inquirer, EMAIL: kendrickfrazier@comcast.net. Mail: 944 Deer Drive NE, Albuquerque, NM 87122. Before submitting any manuscript, please consult our Guide for Authors for style and reference requirements and submittal instructions. It is on our website at www.csicop.org/publications/guide.

Articles, reports, reviews, and letters published in the Skeptical Inquirer represent the views and work of individual authors. Their publication does not necessarily constitute an endorsement by CSI or its members unless so stated.
Copyright ©2015 by the Center for Inquiry and the Committee for Skeptical Inquiry. All rights reserved.
Subscriptions and changes of address should be addressed to: Skeptical Inquirer, P.O. Box 703, Amherst, NY 14226-0703. Or call toll-free 1-800-634-1610 (outside the U.S. call 716-636-1425). Old address as well as new are necessary for change of subscriber's address, with six weeks advance notice. Skeptical Inquirer subscribers may not speak on behalf of CSI or the Skeptical Inquirer. Postmaster: Send changes of address to Skeptical Inquirer, P.O. Box 703, Amherst, NY 14226-0703.

Skeptical Inquirer September/October 2015 | Vol. 39, No. 5

CONFERENCE REPORT

12
'Reason for Change': Quacks and Cranks, GMOs and Climate, Science and Philosophy—CFI Conference Covers It All

FEATURES

38
'Post-Materialist' Science? A Smokescreen for Woo
SADRI HASSANI

42
The 1848 'Enormous Serpent' of the *Daedalus* Identified
GARY J. GALBREATH

47
Encouraging Evidence-Free Enterprise: Business on a Bed of Sand
BRIAN D. ENGLER AND EUGENIE V. MIELCZAREK

SPECIAL REPORT

22
The Pope's Encyclical on Climate and the Planet: Will It Change the Debate?
KENDRICK FRAZIER

25
Is the Pope Catholic?
KENNETH R. MILLER

SPECIAL ESSAY

35
The Future of the Center for Inquiry
Ronald A. Lindsay

FORUMS

52
Is Wikipedia a Conspiracy? Common Myths Explained
Susan Gerbic

54
Correlations: How Do We Ever Establish Definite Causation?
Morton E. Tavel

COLUMNS

FROM THE EDITOR
'Reason' Topics and Real Science vs. False Mysteries 4

NEWS AND COMMENT
Dawkins, Collins, and the Science-Religion Debate: A New Sociological Study / AMA Tries to Rein in TV Doctors Spreading Misinformation / Physician Wallace Sampson, Expert on False Medical Claims, Dies at Eighty-Five / Ninth Annual IIG Awards Honor *Going Clear*, *Houdini*, Wiseman, Lampoon Dr. Oz / California Passes Cell Phone Warning Law / Wellness Guru Who Promoted Cancer-Curing Diet Admits Hoax 5

INVESTIGATIVE FILES
The Black Madonna: A Folkloristic and Iconographic Investigation
JOE NICKELL 26

PSYCHIC VIBRATIONS
The 'Roswell Slides' Fiasco: UFOlogy's Biggest Black Eye
ROBERT SHEAFFER 30

SKEPTICAL INQUIREE
Playing with Past Lives: The Virginia Boy and the Dead Marine
BENJAMIN RADFORD 33

NEW AND NOTABLE 58

LETTERS TO THE EDITOR 63

THE LAST LAUGH 66

REVIEWS

The Case of the Haunting Handprints
JOE NICKELL 56
The Hand on the Mirror: A True Story of Life Beyond Death
by Janis Heaphy Durham

A Textbook Case in Georgia Remembered
GLENN BRANCH 59
God Sent Me: A Textbook Case on Evolution vs. Creation
by Jeffrey Selman

World-Changing Genius, Creativity, and Teamwork
KENDRICK FRAZIER 60
The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution
by Walter Isaacson

Committee for Skeptical Inquiry

"... promotes scientific inquiry, critical investigation, and the use of reason in examining controversial and extraordinary claims."

[FROM THE EDITOR

'Reason' Topics and Real Science vs. False Mysteries

This issue is packed with topical material. We begin with coverage of our "Reason for Change" conference. Highlights include *New Yorker* writer Michael Specter's blunt talk on GMOs, a live on-stage interview with Richard Dawkins, panels on alternative medicine and climate change, philosophers Rebecca Goldstein and Stephen Law on God and science, and CFI President and CEO Ron Lindsay on the future of CFI (it's good). We report on our challenge to the Heartland Institute on climate change and the pope's encyclical on climate and the health of our planet. (Don't miss biologist Kenneth R. Miller's short essay about that.)

In our lead feature article, physics professor Sadri Hassani takes on a new "manifesto" by a group of known pseudoscientists declaring the end of science and the start of "post-materialist science." He gives them a little history of science lesson, tearing apart their implication that the great scientists who've made revolutionary discoveries were "not mainstream." They most decidedly were. He calls them "mainstreamers who bent the mainstream." Brian Engler and Eugenie Mielczarek continue their series of SI investigative articles revealing the federal government's spending on dubious alternative and complementary medicine, this time via small-business grant programs. And a sea-serpent claim from 1848 is finally solved.

* * *

We are nearly through our thirty-ninth year examining pseudoscientific, fringe, paranormal, and other extraordinary claims that fascinate and confuse the public. The Skeptical Inquirer has always stood for the most reliable, most authoritative scientific and scholarly information about all the dubious claims that attract and assault us. When the facts aren't yet known, we *investigate*. When we already know the answers, we *educate*—and *explain*. When the issues and claims and counterclaims are complex (as is often the case), we *analyze*. Always, we do our best to promote good science and scientific thinking. And we seek to help everyone better understand and interpret what they see, hear, and read and to encourage them to think more critically.

By "we," I mean hundreds and thousands of scientists and scholars in virtually every field, worldwide, plus a smaller number of incredibly tenacious investigators who go into the field to find the truth about the latest popular mysteries. It is a remarkable set of skills and perspectives all these people have. We have helped form a real community for scientists, scholars, and investigators worldwide to investigate and to discuss the important issues these topics raise. All of us do our best to nudge everyone to a more rational, evidence-based view of the world.

Overall, I think SI and the Committee for Skeptical Inquiry have together been a major force helping to contain the influence of self-deception, gullibility, and uncritical belief. We've helped keep alive among the public the idea that the wonders of science and nature far exceed the false mysteries of pseudoscience and bogus science. And we have championed the view that the remarkable methods of science are in themselves a cherished treasure of modern civilization very much worth defending, preserving, and nurturing.

—Kendrick Frazier

Skeptical Inquirer™

THE MAGAZINE FOR SCIENCE AND REASON

EDITOR Kendrick Frazier

DEPUTY EDITOR Benjamin Radford

MANAGING EDITOR Julia Lavarnway

ASSISTANT EDITOR Nicole Scott

ART DIRECTOR Christopher Fix

PRODUCTION Paul E. Loynes

WEBMASTER Matthew Licata

PUBLISHER'S REPRESENTATIVE Barry Karr

EDITORIAL BOARD James E. Alcock, Harriet Hall, Ray Hyman, Scott O. Lilienfeld, Elizabeth Loftus, Joe Nickell, Steven Novella, Amardeo Sarma, Eugenie C. Scott, Karen Stollznow, David E. Thomas, Leonard Tramiel

CONSULTING EDITORS Susan J. Blackmore, Kenneth L. Feder, Barry Karr, E.C. Krupp, Jay M. Pasachoff, Richard Wiseman

CONTRIBUTING EDITORS D.J. Grothe, Harriet Hall, Kenneth W. Krause, David Morrison, James E. Oberg, Massimo Pigliucci, Robert Sheaffer, David E. Thomas

Published in association with CENTER FOR INQUIRY

CHAIR Edward Tabash

CHIEF EXECUTIVE OFFICER Ronald A. Lindsay

CHIEF FINANCIAL OFFICER Barry Karr

CORPORATE COUNSEL Brenton N. VerPloeg, Nicholas J. Little

BUSINESS MANAGER Patricia Beauchamp

FISCAL OFFICER Paul Paulin

SUBSCRIPTION DATA MANAGER Jacalyn Mohr

COMMUNICATIONS DIRECTOR Paul Fidalgo

DIRECTOR OF LIBRARIES Timothy S. Binga

DEVELOPMENT DIRECTOR Martina Fern

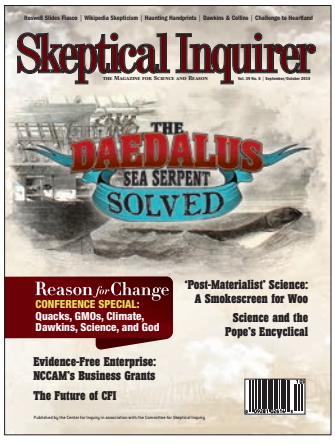
DIRECTOR, COUNCIL FOR SECULAR HUMANISM Tom Flynn

DIRECTOR, CAMPUS AND COMMUNITY PROGRAMS Debbie Goddard

DIRECTOR, SECULAR ORGANIZATIONS FOR SOBRIETY Jim Christopher

DIRECTOR, AFRICAN AMERICANS FOR HUMANISM Debbie Goddard

BOARD OF DIRECTORS R. Elisabeth Cornwell, Kendrick Frazier, Barry A. Kosmin, Hector Sierra, Edward Tabash (chair), Leonard Tramiel, Judith Walker. (Honorary): Rebecca Goldstein, Susan Jacoby, Lawrence Krauss.


Skeptical Inquirer
THE DAEDALUS SEA SERPENT SOLVED
Reason for Change
CONFERENCE SPECIAL:
Quacks, GMOs, Climate, Dawkins, Science, and God
'Post-Materialist' Science: A Smokescreen for Woo
Science and the Pope's Encyclical
Evidence-Free Enterprise: NCCAM's Business Grants
The Future of CFI

Cover image: An iconic drawing of the *Daedalus* animal, as published in *The Illustrated London News*. This was produced by a professional artist with advice from Captain Peter M'Quhae.

Dawkins, Collins, and the Science-Religion Debate: A New Sociological Study

Declan Fahy

A new study appears to dent zoologist Richard Dawkins's influence as a public intellectual, arguing that he does not persuade new readers that science and religion are in conflict. But the researchers concluded that biologist Francis Collins, director of the National Institutes of Health and an evangelical Christian, could persuade audiences that science and faith can be compatible.

The sociological study, published in *Public Understanding of Science*, surveyed 10,000 Americans to assess in part how scientists who write popular books influence public views of religion. It identified citizens' views about the relationship between science and religion and tested whether these views changed after learning about Dawkins, author of *The God Delusion*, and Collins, author of *The Language of God: A Scientist Presents Evidence for Belief*.

The study, funded by the philanthropic John Templeton Foundation, which promotes dialogue between science and religion, found that more than 21 percent of citizens had heard of Dawkins, while just over 4 percent had heard of Collins.

Researchers conducted an experiment within the survey, telling those people who had not heard of Dawkins—almost 79 percent—about his life and opinions and then asking them if their views about science and religion had changed. After learning about Dawkins and his views, citizens reported their opinions had not changed. They instead retained their existing views that science and religion were either in conflict, in collaboration, or independent realms. By contrast, citizens who had not heard of Collins—almost 96 percent—and were then told about his worldview shifted away from conflict and independence views toward a collaborative view.

West Virginia University sociologist Christopher Scheitle, the study's lead author, said public attitudes toward atheists could explain why Collins had more power than Dawkins to sway opinions. Scheitle said in a media release: "Research has shown that the U.S. public is generally distrustful of atheists and views them more negatively than most other ethnic, religious, and minority groups. On the other hand, religious individuals are often perceived as more trustworthy, especially as viewed by other religious individuals."

Zoologist and prominent atheist Richard Dawkins (left) and Francis Collins, director of the National Institutes of Health and an evangelical Christian.

Dawkins, in effect, gave atheism a place in public life.

But the study did not address what has been Dawkins's central function as a public intellectual in modern science and religion debates: his catalytic role as the figurehead for a new social movement of atheists.

As I argue in my recent book on celebrity scientists, Dawkins's major social importance comes at the intersection of two cultural trends. In the first, our media-driven fame culture demands that abstract issues and ideas and worldviews are personified by prominent stars. In the second, as scholars of religion have long recognized, atheists have attracted significant personal and social stigma and have been granted a limited space in U.S. public life.

Dawkins had earned cultural prominence and a devoted following since the 1976 publication of *The Selfish Gene*, but with the 2006 publication of *The God Delusion* he became the embodiment and chief articulator of an aggressive atheism. The book's call-to-arms for atheism—its appendix listed atheist support groups—connected with citizens worldwide, selling more than one and a half million copies and remaining on *The New York Times* best seller list for more than fifty weeks.

In his review of the book for *Science*, writer and publisher of *Skeptic* magazine Michael Shermer pinpointed the reason for the book's popularity. He argued its success showed a "market testimony to the hunger many people—far more, I now think, than polls reveal—have for someone in a position of prestige and power to speak for them in such an eloquent voice."

Indeed *The God Delusion* became an iconic text, a foundational book for the turn-of-the-century new atheist cultural movement, along with Sam Harris's *The End of Faith*, Daniel Dennett's

Breaking the Spell, and Christopher Hitchens's *God Is Not Great*. A global community of atheists used the books to express and deepen their identities.

Dawkins gave atheism its public face, wrote one of its modern core texts, and built a community around his personal brand of atheist advocacy, centered on the Richard Dawkins Foundation for Reason & Science where followers could build a network of alliances, friendships, and social support.

With these endeavors, Dawkins ensured new atheism demonstrated what sociologists identified as the core characteristics of social movements: they are in conflict with identifiable opponents, linked by informal networks, and feature a collective identity.

The *Public Understanding of Science* study underlines the enhanced importance of elite figures in influencing how citizens come to understand science, religion, and the interactions between the two.

To be fair, the study also notes that citizens surveyed who already knew about Dawkins were more likely to view science and religion as being in conflict. "If a person is already familiar with Dawkins," wrote Scheitle and his coauthor, Rice University's Elaine Howard Ecklund, in their study, "it could be because they are sympathetic with his views and have sought out or regularly consume information where his views would be covered."

Yet this does not give a full account of Dawkins's driving role in forging a new social movement. He became the embodiment of atheism that gave the worldview its necessary public, celebrity face. Moreover, he gave atheism an intellectual core, an informal network, and a collective identity. Dawkins, in effect, gave atheism a place in public life. That remains his chief and perhaps lasting influence in the ongoing debate between science and religion.

Declan Fahy teaches at Dublin City University's School of Communications and writes about Dawkins as well as other scientific intellectuals in *The New Celebrity Scientists: Out of the Lab and into the Limelight* (2015), excerpted/adapted as the cover article in the July/August 2015 Skeptical Inquirer.

AMA Tries to Rein in TV Doctors Spreading Misinformation

David H. Gorski

Dr. Mehmet Oz, a.k.a. "America's Doctor," is a serious problem for science-based medicine. Although he started as a promising academic surgeon, over the past few years he has featured psychic mediums like John Edward and Theresa Caputo, a faith healer, homeopaths, dubious dietary supplements, and even an anti-vaccine activist like Robert F. Kennedy Jr. on *The Dr. Oz Show*, his syndicated television show. Certainly, there have been attempts to counter the medical misinformation Dr. Oz promotes, but they have been largely ineffective. When Senator Claire McCaskill (D-Missouri) hauled him in front of her Senate committee in June 2014 over his unethical promotion of diet supplements as miracle weight loss aids and humiliated him, skeptics rejoiced (SI, September/October 2014).

[The AMA's] position statements do still carry considerable weight.

Unfortunately, Dr. Oz was soon back to his usual antics, just a little more circumspect about supplements. Then in April, a group of physicians and scientists wrote a letter to the Dean of the Faculties of Health Sciences and Medicine at Columbia University to complain that Dr. Oz's extracurricular activities reflected poorly on Columbia, where Oz is faculty. Predictably, the dean invoked academic freedom in response, and Dr. Oz did a whole show attacking the group as industry shills (SI, July/August 2015).

Unfortunately, Dr. Oz is far from alone. There are, for instance, Internet celebrity pediatricians, such as Dr. Bob Sears and Jay Gordon, who spread anti-vaccine misinformation. Where medical boards, universities, and other regulatory bodies have largely failed to address this problem, a medical association has stepped in. In June, the American Medical Association (AMA) finally took a stand against celebrity quacks when it passed a resolution coauthored by Benjamin Mazer, a medical student who has spearheaded *Doctors in Oz*, a blog and project whose purpose is to highlight and publicize the harm caused by bogus medical advice given by Dr. Oz, and Joy Lee, another medical student and member of the AMA-Medical Students Section Committee on Legislation and Advocacy.

This resolution (http://www.doctorsinoz.com/blog/medical-students-take-action/) states that the AMA will issue a public statement reiterating the importance of transparency to the profession and resolves to craft guidelines on how doctors can ethically use media to help the public. In addition, the AMA will issue a report on what disciplinary pathways might exist for doctors who continue to abuse their access to the media to spread medical misinformation.

Even though this resolution is definitely a move in the right direction, it should be noted that the AMA cannot actually enforce anything because it is not a regulatory or governmental body. However, despite its membership having fallen from approximately 75 percent of American physicians in the 1950s to less than 20 percent of physicians today, it is still the single largest medical association in the United States; its position statements do still carry considerable weight. Thus it is still important that the AMA has taken a position on this issue because it still represents the single largest megaphone that physicians have to the public. As such, it could potentially pioneer new ethical guidelines for how physicians should disseminate information in the media and online.

It is also never a bad thing for such a prominent doctors' group to reiterate formally that a physician has an ethical obligation to his patients and profession to be evidence-based in all medical information that he or she promotes in public. It is just very unfortunate that such a resolution needed to be issued in the first place.

David H. Gorski, MD, PhD, FACS, is in the Departments of Surgery and Oncology at Wayne State University School of Medicine and a surgical oncologist at the Barbara Ann Karmanos Cancer Institute. A CSI fellow, he writes regularly for SI and blogs on medical-related pseudoscience.

Physician Wallace Sampson, Expert on False Medical Claims, Dies at Eighty-Five

Harriet Hall

The skeptical community has lost a shining star. On May 25, 2015, Wallace Sampson, MD, died in California at the age of eighty-five from complications of heart surgery; he had been in the hospital since February. He is survived by his wife of fifty-nine years, five sons, and nine grandchildren.

Wally was an oncologist and professor emeritus at the Stanford University School of Medicine. He started looking into false medical claims after he saw patients resorting to the bogus cancer cure Laetrile. He soon became an expert in dissecting false claims both in conventional medicine and in unconventional practices such as acupuncture and homeopathy. An indefatigable crusader for science and reason, he seemed to be everywhere. He wrote for medical journals and popular publications, appeared on television and in podcasts, testified in court, taught a course on alternative medicine at Stanford that emphasized its unscientific aspects, spoke at conferences, and was often quoted in the media.

He was one of the founders of the National Council Against Health Fraud, the *Science-Based Medicine* blog, and the Institute for Science in Medicine. He was also a member of many other scientific and skeptical organizations such as the Friends of Science in Medicine. He was a fellow of CSICOP, contributed articles to Skeptical Inquirer, and was part of the second CSICOP delegation to China that investigated traditional medicine and pseudoscience in that country. He founded and edited *The Scientific Review of Alternative Medicine* under the auspices of the Center for Inquiry. He was on the faculty of CSI's Skeptic's Toolbox workshop in Eugene, Oregon, from 1998 to 2008.

I never really got to know Wally that well, but he changed my life forever. I didn't meet him until I was in my late fifties, when I attended the 2002 Skeptic's Toolbox. At the time, I knew next to nothing about alternative medicine or about how to critique a scientific study. As part of his presentation, Wally showed a video of the *Scientific American Frontiers* episode on chiropractic in which Alan Alda said that chiropractic neck manipulation was associated with a significant percentage of strokes. I questioned that, and when I got home I did my own research and determined that the claim was true. In the process, I stumbled upon a lot of other things about chiropractic that intrigued me enough to make me read everything I could find on it, both pro and con. One thing led to another. You might say chiropractic was my gateway drug to critiquing alternative medicine, and it might never have happened if Wally hadn't sparked my interest.

When I came across a really stupid pseudoscientific study that was being used to promote the bogus product "Vitamin O," I felt comfortable enough with Wally to complain to him about it via email. He replied, "You know, no one takes studies like that seriously enough to critique them. Why don't you write up a formal critique and we'll publish it in *The Scientific Review of Alternative Medicine*." I protested that I wouldn't know how to do that, but he insisted, saying he was confident that I could do it and he would help with editing. He persuaded me. I chafed at the constraints of writing formally for a scientific journal, so I wrote another, irreverent version of my findings and submitted it to Skeptical Inquirer as "Oxygen Is Good, Even When It's Not There."

And so my career as a writer was launched. As I continued to write, Wally continued to provide encouragement, praise, and support. His emails validated my work and motivated me to keep going. Over the years, a pattern developed. At the Toolbox or in an email, Wally would say something that would strike me as questionable or overly pessimistic. I would investigate and would invariably find that he was accurate and that the problem was even *worse* than he said. I developed a high respect for his judgment.

When Wally retired from the Toolbox in 2008, I was chosen to replace him. I could never hope to fill his shoes, but by then I had some shoes of my own.

I wish I could have gotten to know him better. He was kind, gentle, grandfatherly, professorial, approachable, modest, and a true gentleman. My daughter attended the Toolbox with me when she was a teenager, and she was quite fond of Wally. When we chanced to see him being interviewed on television, she would say, "Look, there's Grandpa Wally!"

Wallace Sampson was my mentor. He was responsible for launching my writing career and for making me who I am today. He is gone, but his work in science and skepticism will never be forgotten. Thank you, Wally. *Requiescat in pace*.

Harriet Hall, MD, writes about questionable medical claims. She is an SI contributing editor and a fellow and a member of the Executive Council of the Committee for Skeptical Inquiry.

Ninth Annual IIG Awards Honor *Going Clear*, *Houdini*, Wiseman, Lampoon Dr. Oz

Owen Hammer

On June 28, 2015, at the Steve Allen Theater in Hollywood, the Independent Investigations Group (IIG)—a network of skeptical organizations affiliated with the Committee for Skeptical Inquiry—presented its ninth annual IIG Awards recognizing the promotion of science in the popular arts. The "Iggies " are the only such awards offered in North America, and the event drew the usual unique crowd of artists, scientists, and fans.

The first award was presented by comedian Jim Coughlin to the documentary feature *Going Clear: Scientology and the Prison of Belief*. The movie was particularly relevant at CFI–Los Angeles in Hollywood, which is close to a number of Scientology buildings.

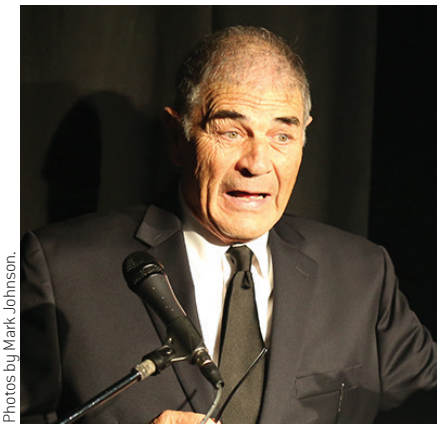
The second presentation was the Truly Terrible Television Award presented to those shows that display a shocking lack of skepticism. This year there was no contest; it was won by *The Dr. Oz Show*. Comedienne Hannah Gansen presented the framed certificate printed on "genuine imitation parchment." Of course, no one from *The Dr. Oz Show* was in attendance . . . or so we thought.

The face of "Oz the Great and Powerful" appeared on the video screen. The omnipotent floating head (actually actor Ron Lynch) declared in the third person that Oz had become super-powered by his great medical advice. However, once the video screen was retracted, it turned out that "Oz" was sitting in a wheelchair, breathing from an oxygen tank, and transmitting his image through an iPad camera. Taking pity on the decrepit man, Hannah handed him the certificate, and "Oz" promised to put it on his wall "where his medical license should be."

The third award returned us to a more serious tone. Academy Award–nominated actor Robert Forster presented an award to *Houdini*—Lionsgate Television's exhaustive mini-series chronicling the life and times of the great-great-grandfather of skepticism. There to accept the award was Hollywood legend Nicholas Meyer (*Star Trek*, *The Day After*), who wrote the screenplay, an adaptation of his father's biography of Houdini. Also in attendance was Gerald W. Abrams, executive producer of *Houdini* and accomplished producer of historical dramas. Said Meyer, "I am extremely grateful to Gerry [Abrams] . . . for the really wonderful opportunity he gave me and the great time that we had together putting this movie together . . . [T]he icing on the cake . . . is this award, which we were far from expecting, so thank you all very, very much."

Forster remained on the stage to present our last award—induction into the Houdini Hall of Honor (HHH). The HHH also includes Carl Sagan, James Randi, Joe Nickell, Martin Gardner, Isaac Asimov, Ray Hyman, Neil deGrasse Tyson, and Eugenie Scott. This year the honor went to Richard Wiseman, whose Quirkology website features endlessly entertaining videos that challenge viewers' preconceived notions by using clinical psychology and good old magic tricks. Wiseman accepted the award via a pre-recorded video in which he denounced psychics—as paranormal events seemed to be occurring all around him.

The IIG is proud to present this one-of-a-kind event every year. More surprises are planned for the tenth annual awards show.



Photos by Mark Johnson.

Academy Award–nominated actor Robert Forster addresses the crowd about the miniseries *Houdini*.

Hannah Gansen presents "Oz" (Ron Lynch) with the Truly Terrible Television Award.

Nicholas Meyer and Gerald W. Abrams accepting the IIG award for *Houdini* and making an impassioned plea for reason in human affairs.

Owen Hammer is a filmmaker and IIG member living in Hollywood.

California Passes Cell Phone Warning Law

In May, Berkeley, California, became the first American city to pass a measure requiring that cell phones be sold with a health warning about the exposure of users to radio frequency radiation. A May 13 article by Brian Wu for Sciencetimes.com reported that:

> The proposal was passed by a vote of 9-0 and when it goes into effect this summer it will be the first safety ordinance of its kind in the country. Cellphone retailers will be required to include a city-prepared notice along with the purchase of any new cellphone, informing consumers of the minimum separation distance a cellphone should be held from the body.

The measure, which has been called a "right to know law," may be challenged by the cell phone industry on the basis that it violates free speech by forcing retailers to include warnings they may not necessarily agree with. Consumers certainly have a right to know about potential dangers of the products they use, but in this case the scientific evidence overwhelmingly supports the idea that cell phones are harmless. The Centers for Disease Control and Prevention, for example, has found no evidence that cell phones cause cancer.

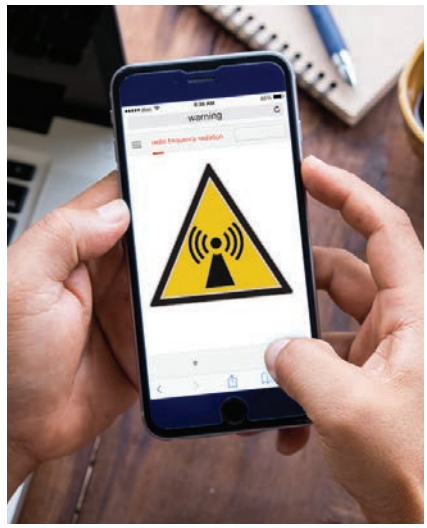
Scientists doubt that cell phones can harm the body for several reasons, including that there is no known mechanism by which radio frequency radiation or electromagnetic fields (EMFs) can cause cancer. Not all radiation is equally harmful; radio waves (such as those emitted by cell phones), like sunlight, are a form of non-ionizing radiation and are considered harmless. Ionizing radiation, such as that found in X-rays, can cause cancer. Furthermore, the electromagnetic fields generated by cell phones are not strong enough to break the molecular and chemical bonds in human cells and therefore can't damage human cells the way ionizing radiation can. Nonetheless, public concern over cell phones has been around for decades, fueled by alarmist news stories and celebrities expressing concerns. (Singer Sheryl Crow, for example, has claimed that her cell phone use may have contributed to her brain tumors.)

As a practical matter, the Berkeley law will likely have little effect other than to falsely suggest that cell phones are dangerous. There's no harm done in reminding consumers about the recommended use of cell phones, but of course warning labels are routinely ignored on countless products from Q-tips (don't use them to clean your ears) to tires (check the air pressure in all four tires and the spare at least once a month). The measure is unlikely to deter anyone from buying or using cell phones, which have become ubiquitous.

Public concern over cell phones has been around for decades, fueled by alarmist news stories and celebrities expressing concern.

Indeed, one interesting aspect to the concerns over the health dangers of cell phones is that the widespread fear has done little to stem the popularity of the product. Typically when the public is concerned about the safety of a product, they reduce (or completely stop) their use of it—for example when fears of bovine spongiform encephalopathy (mad cow disease) hit Great Britain in 1996, beef consumption more or less stopped.

In a 2006 study of cell phone concerns published in the journal *Public Understanding of Science*, Frances Drake noted that "a curious exception to this pattern is the mobile phone. Despite various health concerns and numerous local campaigns against mobile phone masts highlighted in the media, phone sales remain buoyant" in the United Kingdom (and indeed around the world). Thus while many people claim to be concerned about cell phones, few are willing to give them up—though some consumers have chosen to use earpieces instead of holding the cell phones against their heads as they speak; others have purchased special so-called "EMF shields" that can be inserted into cell phones and allegedly block harmful electromagnetic waves (though consumer groups say there's no evidence they are effective). In fact, the main effect of the Berkeley warning will likely be to benefit the manufacturers of ineffective "cell phone radiation shields."



Though there's little evidence that cell phones cause cancer, they are a significant health threat because of the role they play in distracted driving accidents and deaths: "At any given daylight moment across America, approximately 660,000 drivers are using cell phones or manipulating electronic devices while driving," according to the U.S. Department of Transportation.

Benjamin Radford is deputy editor of the SKEPTICAL INQUIRER.

Take action with us.

You can help promote science, reason, and secular values.

Imagine a world where religion and pseudoscience do not influence public policy—a world where religion no longer enjoys a privileged position. The Center for Inquiry is working toward these goals and educating the public to use science, reason, and secular values rather than religion and pseudoscience to establish public policy.

The Center for Inquiry advances its mission through advocacy, education, and outreach programs. No other organizations advance science and secularism on as many fronts as CFI and its affiliates, the Committee for Skeptical Inquiry and the Council for Secular Humanism.

Donate today.

When you make a donation to CFI, you become a member of a worldwide movement of humanists, skeptics, atheists, and freethinkers—all working together to promote the secular worldview and give voice to your values.

Our major goals include:

- Protecting the rights of nonbelievers
- Advocating for science-based medicine
- Sustaining and expanding the secular movement

Make your most generous gift today, or request information on planned giving or making a bequest.

To receive a brochure elaborating on what we are doing to achieve our important goals and how you can help, please complete and return the attached card or contact us at:

Center for Inquiry
Development Office
PO Box 741
Amherst, NY 14226
1.800.818.7071
development@centerforinquiry.net
www.centerforinquiry.net/donate

cfi CENTER FOR INQUIRY CSI COUNCIL FOR SECULAR HUMANISM

Wellness Guru Who Promoted Cancer-Curing Diet Admits Hoax

Benjamin Radford

An Australian woman named Belle Gibson claimed in 2013 that a special diet, along with alternative medicine therapies, cured her terminal brain cancer. Shunning chemotherapy and other proven cancer treatments, she claimed to have healed herself through holistic medicine and proper nutrition. Gibson started a wellness app based on her breakthrough discovery and wrote a cookbook with cancer-curing recipes. She became a rising star in the wellness and alternative medicine industry and won *Cosmopolitan* magazine's "Fun Fearless Female" award for social media.

However, questions were raised about Gibson's story and cancer diagnosis in March 2015 after she told *Australian News* that "she believed she was misdiagnosed by a medical team in Germany—by someone who she now thinks wasn't a medical doctor. She was now seeking treatment from a conventional medical team, which she declined to name." This curious explanation only raised more questions—such as why she wouldn't reveal the name of the person who allegedly misdiagnosed her and how she could not know whether or not that person was really a doctor—and she eventually came clean.

In an April interview, Gibson admitted that she made up the whole story: she never had cancer in the first place, and her claim that a special diet or therapy cured her cancer was false. "Speaking out about the controversy in an exclusive interview with *The Australian Women's Weekly*, Gibson was asked outright if she has, or has ever had cancer. 'No. None of it's true,' she confessed," according to an April 22 story in *The Washington Post*.

Gibson is only the latest and highest-profile person to falsely claim to have been gravely ill. In 2009, for example, a young Canadian woman named Ashley Kirilow made news for fighting bravely against breast, ovarian, brain, and liver cancers. She and her supporters raised over $20,000 for her treatments, but Kirilow eventually admitted that she never had cancer. She had shaved her head and eyebrows to fake the signs of chemotherapy and had spent much of the money given to her on personal expenses. She was charged with fraud but spared jail time. She claimed she faked having cancer because she wanted attention from her family.

Belle Gibson claimed that a special diet and alternative medicine cured her cancer. She later admitted it was a hoax.

Patients will often go to great lengths to make their fake illness seem real to both doctors and supporters.

Often cancer fakers do it for attention and sympathy, not because they are necessarily trying to scam people out of money. Some people really do have a disease—not cancer but a mental illness known as a factitious disorder. People with this disorder pretend to have an illness (usually a terminal one) and often go to great lengths to maintain the hoax. According to the latest edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders*, the prevalence of factitious disorders is unknown. Many cases go undetected due to the deceptive nature of the patients. Often the person successfully ends their hoax by telling friends, family, and other supporters that they are cured, so their deception is never discovered.

The manual notes that "Among patients in hospital settings, it is estimated that about 1% of individuals have presentations that meet the criteria for factitious disorder. The course of factitious disorder is usually one of intermittent episodes." In other words, it's not merely one incident, such as a broken leg or a bout with the flu; potentially terminal illnesses such as cancer are often claimed by the patient, allowing them to carry on the deception for many months and even years.

In some cases the factitious disorder begins with a genuine health scare or preexisting condition that is then exaggerated over time. Patients will often go to great lengths to make their fake illness seem real to both doctors and supporters, including feigning seizures, manipulating lab results (for example by adding blood to a urine sample), and even physically injuring themselves.

It's not illegal to lie about having a disease, but if the person receives donations or free services under false pretenses, he or she may be charged with fraud. Whatever Gibson's motives were in this case, she turned her inspiring "true" story into not only sympathy but profits. She had promised to donate $300,000 from the sales of her app to charity, though the charity reportedly never got it. Despite questions about the donations, authorities have declined to press charges against Gibson. The biggest concern is that cancer patients desperate for a cure might have followed Belle Gibson's diet and alternative medicine suggestions instead of seeking proven medical treatments. ■

Reason *for* Change

Quacks and Cranks, GMOs and Climate, Science and Philosophy—CFI Conference Covers It All

KENDRICK FRAZIER
Photos by BRIAN ENGLER

Reason for Change saw a sell-out crowd of 500 attendess.

Ken Frazier opens the conference with a quick history of CSI and SI.

Rebecca Goldstein signs copies of her book.

Taslima Nasrin and SI contributor Brian Engler at the opening reception.

Ron Lindsay with Morgan Romano of Atheizm Dernegi (Association of Atheism).

The Center for Inquiry returned to its founding and headquarters site, suburban Amherst, New York, outside of Buffalo, for its 2015 conference, June 11–15, and by any measure the event was a fine success. The conference sold out with close to 500 registrants packing the various ballroom sessions and participating in lively intellectual and social interchanges.

"Reason for Change" was its multiple-meaning theme, which seemed to serve the conference well. It was the second consecutive annual conference combining the work of both the Committee for Skeptical Inquiry (copublisher of the Skeptical Inquirer) and the Council for Secular Humanism (copublisher of *Free Inquiry*) as well as CFI's overall mission. But it was the first since those two entities became programs of CFI rather than separate nonprofit organizations.

Scientific skepticism and secularism/humanism blended fairly seamlessly, with numerous plenary sessions where these interests overlapped (about two-thirds of the conference) and some parallel separate-track sessions where the interests seemed distinct (often posing difficult choices for some attendees who wanted to attend both).

There were optional pre-conference tours to the Center for Inquiry headquarters building (only about a mile away) and its extraordinary library of 72,000 books on freethought and scientific skepticism. The library includes a first edition of Thomas Paine's *The Age of Reason* and the notebooks and files of famed skeptics such as Martin Gardner and Steve Allen and early UFO critic Thornton Page (plus papers Keay Davidson used in his biography of Carl Sagan). And there were

The opening session of the conference with Barry Karr, Ken Frazier, and Tom Flynn.

Susan Jacoby on the secular conscience during the Friday night reception and awards ceremony.

post-conference bus tours to nearby Niagara Falls and to the home of "The Great Agnostic" Robert Ingersoll, a three-hour drive away.

The Board of Directors of CFI also met for the better part of three days before the conference, with a few impromptu sessions during the conference itself. The Executive Council of the Committee for Skeptical Inquiry (after being featured at a conference Skeptic Track public session Sunday morning) met in a business meeting for five hours on the Sunday afternoon immediately following the conference's end. I am on both, so it made for a long if stimulating week; it also required my missing a few conference sessions I wanted to see.

Ronald A. Lindsay, CFI's president and CEO, welcomed participants at an informal Thursday evening reception. He would later point out that the two strains that unite all aspects of the now-combined organization are a respect for critical, evidence-based thinking and a disdain for dogma.

The next morning things got underway in earnest, with Jim Underdown of CFI–Los Angeles beginning his conference emcee duties. I opened things with a twelve-minute illustrated overview of some historical highlights of CSICOP (now CSI) and SI. The organization got its start thirty-nine years ago, almost exactly across the street from the conference hotel at the then-new Amherst campus of the State University of New York at Buffalo in May 1976, when philosophy professor Paul Kurtz called a conference on "The New Irrationalisms" and announced the founding of CSICOP.

I told the story mainly through the way others (especially outside media) reported on us in our early years. Articles in the *New York Times*, *Time*, *Science News*, *Smithsonian*, *Reader's Digest* (then translated into dozens of foreign language editions), *Psychology Today*, and the *Wall Street Journal* heralded the creation and early work of CSICOP. One such example was Carl Sagan's famous "The Fine Art of Baloney Detection" article in *Parade*, the national Sunday newspaper supplement. The article included a box about CSICOP and the Skeptical Inquirer, calling SI "cheerful, irreverent, instructive, and often very funny." This was early input to Sagan's later book about pseudoscience and irrationality, *The Demon-Haunted World*, published the year he died.

An even more important article was cognitive scientist (and later CSICOP fellow) Douglas Hofstadter's March 1982 *Scientific American* article thoughtfully contrasting the two modes of inquiry of the Skeptical Inquirer and the *National Enquirer*, the era's best-known sensationalist tabloid. Hofstadter had clearly read the Skeptical Inquirer deeply and carefully. He quoted at length from key articles. He strongly recommended CSICOP and SI. He called us "a steady buoy to which one can cling in the sea of [irrationality] that all of us are drowning in." This wonderful article prompted so much interest that over the next few months SI's circulation nearly doubled. (The article also had a ripple effect in other countries, such as Germany when published two months later in the German-language edition of *Scientific American*.)

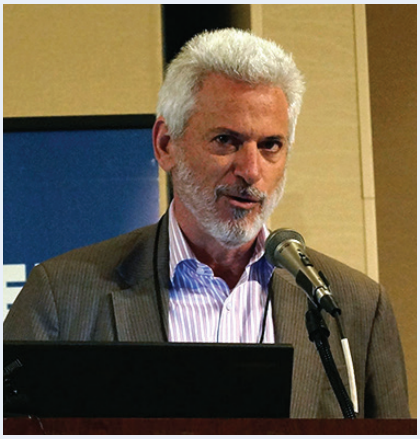
Hoftstadter later reprinted the article in his book *Metamagical Themas*, with a lengthy epilogue commenting upon reaction to it and providing further thoughtful consideration of the issues SI struggles with. I told the audience that I considered Hofstadter's article "the most substantive, detailed, and positive article ever written about us. It may still be."

I then jumped ahead to recent times and the present. "Overall," I concluded, "I think SI and the Committee for Skeptical Inquiry have been a major influence helping to contain the influence of [pseudoscientific and antiscientific] impulses and to keep alive among the public the idea that the wonders of science and nature far exceed the false mysteries of pseudoscience and bogus science."

Tom Flynn, editor of *Free Inquiry* and director of the Council for Secular Humanism, followed with a similar illustrated overview of their history and recent influence.

* * *

Here are just a few highlights from the conference that struck me as of particular interest for our readers. (Again, I couldn't get to all sessions.)



Michael Specter chides opponents of GMOs.

GMOs: Potential and Promise

New Yorker writer Michael Specter spoke on one of the hottest and most surprisingly controversial topics of recent times: GMOs (genetically modified organisms). Specter's book *Denialism* won CSI's 2009 Balles Prize for Critical Thinking, and he applied the same critical thought to the GMO topic. He said he'd tried not to write about GMOs for twenty years but can no longer avoid the topic, as society's unfortunate view seems to be that scientists are concocting "some Martian-like different species." He emphasized that GMOs can help fulfill global shortages of food and said to think they are more a danger than a boon to addressing hunger is a "big disconnect" from reality. "These are important tools," he said. "Over the next thirty-five to forty years, we must grow more food than through all of history."

"Over the next thirty-five to forty years, we must grow more food than through all of history."

—Michael Specter

He chided opponents of GMOs living in wealthy enclaves in the United States and Europe who shop at expensive health food stores ("which no one should ever do"), think "natural" is somehow a meaningful and meritorious term, and seem unaware of how serious the problem of feeding and providing necessary nutrients such as vitamin A to less-developed parts of the world is—and will become, unless the potential of GMOs can be realized.

"We have been modifying food for 10,000 years," Specter noted. Adding or modifying genes to make key crops have bigger yields or be more resistant to pests is along that same continuum of progress.

"What GMOs really can do, they are not being allowed to" because of fear-mongering opponents, he said. He said he likes Monsanto, one of the main companies making GMOs and a target of GMO opponents. Nevertheless, he said, "There are tons of [GMO] products that have nothing to do with Monsanto. Some include a gene that kills pests, so the farmers don't need to spray insecticides." That, he implied, should be considered a *good* thing. As for the Roundup brand spray that is also a frequent target of GMO opponents, "Roundup replaced two other products that were far more toxic."

Critical thinking and better appreciation of the science is needed, he said. Perhaps it would help, he said, to point out that (injected) insulin is a GMO. When you say that, he said, people get it and may realize, just perhaps, that GMOs can be useful.

Crank Anthropology

For her lecture, anthropologist Eugenie C. Scott, the longtime fearless defender of teaching evolution in schools, shifted gears ("back to my roots," she put it) and addressed a topic of classic pseudoscience: crank anthropology. She gave a little primer on the differences between science and pseudoscience. One of her comments CSI Fellow Dave Thomas later put on Facebook as a nicely designed Internet "Thought for the Day": "Pseudoscience claims the mantle of science, but fails to earn it." She described a few examples of pseudoscience in her field,

Eugenie C. Scott speaking on crank anthropology.

including the Aquatic Ape hypothesis, alleged human/ET hybrids (she outlined the barriers evolution provides to hybridization of vastly different creatures), and a number of fake Bigfoot claims. "All passed the test of being pseudoscience," she said.

Alternative Medicine Panel

Steven Novella, Harriet Hall, and David Gorski (all physicians and fellows of CSI) took part in a panel exploring the troubling trends in popular and institutional encouragement of non-science-based medicine.

Novella began by lamenting that alternative practitioners are promoting a double standard, "literally carving out an alternative universe." He ended answering a question from the audience about critical thinking. "Once they are true believers, evidence doesn't help," Novella said. "You have to do it earlier."

The alternative medicine panel: Harriet Hall, Steven Novella, David Gorski, and moderator Leonard Tramiel.

Hall emphasized that there is no such thing as alternative medicine, only medicine supported by science. The term is nevertheless used for what used to be called "quackery," "folk medicine," or "fringe medicine" and "includes fanciful things that couldn't possibly work." Troubling signs of it are uncontrolled, poorly designed, never replicated experiments, statements from physician proponents beginning "In my experience" (she calls that "a very dangerous phrase), and anecdotes. Another problem is that proponents use the same word *evidence* that scientists do "but with a totally different meaning." (This is why Novella and colleagues are promoting the concept of *science*-based medicine; see Novella's recent SI column "It's Time for Science-Based Medicine" May/June 2015.)

David Gorski sharing on "quackademic" medicine.

Gorski gave an overview of "quackademic" medicine, noting (as have a number of recent SI investigative articles) that the U.S. government is spending close to half a billion dollars a year on "complementary and alternative medicine." "Medicine should be based on science," he emphasized. He noted one prominent proponent of alternative remedies at Yale has called for "a more fluid concept of evidence" than typically demanded by science, meaning one where controlled experiments aren't required. "Integrative medicine" is now the new faddish term for the same thing as before. Gorski calls it "integrative quackery." He ended with a pungent equation: "Integrative Medicine = Medicine + Myth."

"Once they are true believers, evidence doesn't help," Novella said. "You have to do it earlier."

Two Philosophers, on Science . . . and the God Argument

Philosopher, novelist, and MacArthur Fellow Rebecca Goldstein gave a spirited luncheon keynote talk about what she calls "mattering." That night she received CFI's Morris D. Forkosch Award for Best book for her *Plato at the Googleplex: Why Philosophy Won't Go Away* (2014). Mattering starts with questions. The question "What *is*?" is our trying to get our bearings. And that captures something very distinctive about our species. It has resulted in science, philosophy, and religion. Religion's

answer to that question is "God is." If that were true, if "God is," Goldstein said, "that would change the entire decor of the universe."

"What *matters*?"—including whether we ourselves matter—is a second universal question. Both religion and secular reason have distinctive approaches to these two questions. Religion says, "God matters, and we matter to God," since we are made in his image. In this view, Goldstein says, "He appears to take us almost as seriously as we take ourselves—which is gratifying."

The problem is some people matter more. "And that leads to terrible atrocities."

A seeming corollary to this view is that "If God *isn't*"—if there is no God—then human life doesn't matter. And if life doesn't matter, it's a "moral free-for-all." This is an invalid inference, she notes; it's the fallacy of denying the antecedent.

With the ancient Greeks, mattering didn't depend on gods. "They kicked the gods out of mattering." They were intent on "keeping the terrible gods out of it." And that created the preconditions for philosophy and then science.

The tools of science are powerful, but "there's nothing simple about the scientific methodology. Even calling it a methodology—as if there are simple step-by-step rules—is misleading." Science makes use of observation, theory, induction, deduction, abduction, intuitions, prediction, experiment, modeling, and computer simulations. "Science is not a simple follow-the-rules procedure. But the most essential fact about science is that it always leaves open the possibility that we're getting 'What is?' wrong, even at the most fundamental level." Science "directs its ingenuity to trying to get nature to correct us when we are wrong."

Says Goldstein, "We need fellow knowledge-seekers to show us the blind spots in our thinking."

The two arms of reason—what used to be called natural philosophy and is now called science and moral philosophy—have made progress over the course of the centuries, expanding our points of view both scientifically and morally.

Goldstein praised the conference theme, "Reason for Change," with its "deliberate ambiguity, the kind of semantic gestalt switch it forces the mind to make." And she concluded: "Why shouldn't we get to be inspired, reasonably inspired, by reason itself?"

* * *

In a Sunday morning lecture, Stephen Law, senior lecturer in philosophy at Heythrop College, University of London, and provost of the Centre for Inquiry–UK, described what he calls The Evil-God Challenge. He wrote about this previously in the Skeptical Inquirer in an article titled "The God of Eth" (SI, September/October 2005, available on our website at csicop.org).

It was an interesting complement to Goldstein's talk. He called it "a simple argument." It began with most believers' sense of God as omnipotent and all good. He asked, Is belief in this God reasonable? He found that the typical arguments "provide no grounds to suppose that this being is all good or all powerful." He then brought up the question of gratuitous evil. "If gratuitous evil exists, God does not. But gratuitous evil exists. Therefore, God does not exist."

"It is a great argument," Law said, "but Christians are ready for it." They simply say, "God works in mysterious ways." They say God gave us free will, and it follows that suffering results. Bad experiences can make us suffer, "but no pain, no gain." Anyway, free will leads to more good than suffering. He restated this view as, "It's arrogant of us to suppose we can understand the mind of God—an infinitely wise being. . . . So belief in God is not so unreasonable."

He then proposed an alternative hypothesis: "There is a God. He is all powerful and all *evil*." "This is just as well-supported as the other arguments," Law said, "Yet Christians would reject it out of hand as ludicrous." Why, they ask, would an evil god give us sunsets and mountains, healthy bodies, children, and good deeds and bestow on many of us good fortune and wealth?

Rebecca Goldstein gives a spirited luncheon keynote speech on "mattering" and questioning.

"We need fellow knowledge-seekers to show us the blind spots in our thinking."

—Rebecca Goldstein

Stephen Law offers the Evil-God Challenge.

"We can reasonably rule out an evil God," Law argued. But, using a similar argument, "Then why can't we rule out a good God?" The argument is the same. "The real mystery is, why do so many fail to see this?"

The first question from the audience following Law's talk came from Richard Dawkins. Dawkins said if he believed that way he'd just say, "The God I believe in is unconcerned, indifferent."

Law's quick answer to that was, "Then why should I worship—and be eternally grateful to—this being?" And the lively discussions went on from there.

Climate Change Panel

A big gap continues between the abundant scientific evidence for climate change and global warming and the public's perception that even if true (which many in the United States doubt), humans aren't responsible for it. The Skeptical Inquirer has been reporting on the scientific evidence and these issues of troubling anti-science since 2007.

Jim Underdown introducing the Climate Change panel: Ken Frazier, Mark Boslough, Scott Mandia, Jan Dash, and Joshua Rosenau.

As moderator of an afternoon panel on climate change, I offered one new data point: The alleged hiatus in global warming that opponents have made so much of doesn't exist. Using newly developed and more accurate data sets of land and ocean surface temperatures, and two additional years of data, scientists at the National Oceanic and Atmospheric Administration found that the hiatus vanishes. The rate of warming from 1998–2014 is almost identical to the rate of warming from 1950–1999. (See theconversation.com/improved-data-set-shows-no-global-warming-hiatus-42807.) This announcement came just a few days before our panel and is now published online in *Science* (http://scim.ag/TKarl). Yet, I cautioned, don't expect this to sway contrarians, because factors other than the scientific evidence, such as whom one trusts and identifies with, tend to carry more weight.

Scott Mandia, professor of earth and space sciences at Suffolk County Community College and cofounder of the Climate Science Rapid Response Team, expanded on that point in his presentation "Sometimes It's Not about the Science." Mandia outlined a number of factors other than the science that influence opinion about climate change. Public confusion is being driven by "merchants of doubt" who have very deep pockets and a desire to maintain the status quo. Numerous conservative "think tanks" with "experts" (a significant proportion of whom have no scientific training) result in a loud megaphone, with 108 climate change denial books written just through 2010 linked to them. Ninety percent undergo no peer review, allowing authors to recycle scientifically unfounded claims. Political ideology plays a big role.

CSI Dares Heartland Institute to Take Up $25,000 Climate Change Challenge

Ron Lindsay giving his conference-concluding remarks Sunday.

The Committee for Skeptical Inquiry has offered a $25,000 challenge to The Heartland Institute concerning the reality of climate change.

The Heartland Institute, a Chicago-based conservative and libertarian public policy think tank, is a well-funded bastion of science-denial. It sponsors conferences and writings aggressively promoting positions contrary to widely accepted scientific consensus, most recently contending that global warming stopped in 1998 and parroting other popular memes of climate science denialism.

CSI has offered to pay an education charity designated by the Heartland Institute $25,000 if a widely accepted measure of climate warming, the thirty-year-moving average of global land surface temperatures, is not higher on December 31, 2015, than it was the previous year. On the other hand, if this measure of global warming is higher at the end of 2015, the Heartland Institute must pay $25,000 to a science education nonprofit designated by CSI.

The challenge was announced by Center for Inquiry President and CEO Ronald A. Lindsay at the end of a panel on Climate Change at CFI's "Reason for Change" conference in Amherst, New York, on Saturday, June 13. The following Monday, June 15, he sent a letter to the Heartland Institute presenting the challenge. CSI/CFI issued a news release later the same day.

As of this writing, the Heartland Institute has not responded.

The text of that release is on page 18.

CSI Dares Heartland Institute to Take Up $25,000 Climate Change Challenge

Text of the CSI news release:

A leading science advocacy group is throwing down the gauntlet to the Heartland Institute, a group that claims that global warming stopped in 1998, with a stark, simple challenge: If the 30-year average global land surface temperature goes up in 2015, setting a new record, the Heartland Institute must donate $25,000 to a science education nonprofit.

The challenge is presented by the Committee for Skeptical Inquiry (CSI), a program of the Center for Inquiry, which held its "Reason for Change" conference last week in Buffalo, at the same time as Heartland's own climate conference in Washington, D.C. Heartland's gathering opened with a keynote address by Sen. James Inhofe (R-OK), who believes that global warming is "the greatest hoax ever perpetrated on the American people."

Among the key findings of a 2013 report published by Heartland was that "The level of warming in the most recent 15 year period [since 1998] is not significantly different from zero" and "natural variability is responsible for late twentieth century warming and the cessation of warming since 1998." While the report's authors dismissed global warming forecasts published by mainstream scientists, they have avoided making any testable predictions of their own.

"If anyone really thinks that human-caused global warming is a hoax, and that the climate has stopped heating up, they must also believe that temperatures will now stabilize or drop," said Mark Boslough, a physicist and CSI fellow who devised the challenge. "Well, that's a testable claim, so let's test it."

"It's time for the Heartland Institute to put its money where its exhaust pipe is," said Ronald A. Lindsay, president and CEO of the Center for Inquiry, home of CSI. "If Earth's climate gets hotter, and keeps getting hotter, the naysayers at Heartland should publicly own up and pay up."

If CSI's prediction proves incorrect, and the 30-year average global temperature does not go up, CSI agrees to donate $25,000 to an educational nonprofit designated by the Heartland Institute.

CSI offered the following challenge:

> The Committee for Skeptical Inquiry (CSI) hereby presents to the Heartland Institute a challenge as to whether the Earth's climate will set a new record high temperature this

"Republicans are motivated to deny climate change and other environmental problems because of their aversion to the perceived solutions which may infringe on their ideological values," Mandia said. He described Dan Kahan's research indicating that "individuals subconsciously resisted factual information that threatened their defining values." Other research by Kahan shows that the message (in this case about climate change) is trusted when the messenger is from the same peer group. Climate scientists are not in most conservatives' peer group.

So what to do? Use examples that relate to that audience's worldview. Point out that the evidence for climate change is accepted not just by scientists and science academies but also by the U.S. military, health officials, and insurance companies. All consider it a serious problem. None are considered liberal tree-huggers. Putting it all together, Mandia counsels to lead with the facts, keep arguments simple, warn the listener before stating the myth, align the message with the person's cultural worldview, and provide a more credible alternative.

Jan Dash on the risks of climate change.

Jan Dash, Climate Initiative Chair and managing editor of the Climate Portal website for the Unitarian Universalist United Nations Office, is an expert on risk management. He spoke on managing the risks of climate change and of contrarian obstruction. The risks are higher in the future (the next fifty to 100 years) than they are now, and that is one problem; we're not good at assessing future risks. Economic risks include breakdown of supply lines and markets via increased political instabilities and other serious impacts. Energy risks include a collapse of the fossil fuel sector. Financial risks include over-leveraging by our descendants for future borrowing to cope with climate impacts. But there are also risks to the oil industry, a loss of reputation and possible legal risks. Underappreciated are the positive opportunities to business in mitigating climate change. Dash offered no silver bullet: he said we need innovative strategies by individuals, business, and all levels of government.

Scott Mandia on what influences public opinion on climate change.

Joshua Rosenau, programs and policy manager for the National Center for Science Education (NCSE), said climate change is a critical part of science education and warned that deniers, just like antievolutionists, are targeting the schools. More science and better education matter, and there's a lot scientists and skeptics can do on that front. But he suggested we can't just win with better education or by throwing more science at people; we need to forge effective cultural and social connections to diffuse this fight. He said NCSE can help folks find the best ways to make those connections and get involved.

Albuquerque computational physicist and CSI Fellow Mark Boslough, another panelist, was the primary mover behind the December statement "Deniers Are Not Skeptics" signed by fifty-two Committee for Skeptical Inquiry fellows (SI, March/April 2015) and more than 28,000 others so far (see http://act.forecastthefacts.org/sign/skeptics/). At the panel he spoke on his proposal to create climate futures markets, a way to "bet" on future climate trends. This would allow businesses at risk from global warming, such as agriculture, to hedge against climate-related losses and would provide a market-based consensus on the rate of change that could be used as an index for a carbon dumping fee that would increase automatically with future temperature. His interest in climate futures markets led him to propose a challenge to deniers based on that concept. Immediately following the planned presentations by the climate change panelists, CFI President Ronald A. Lindsay came up to the lectern and announced the Committee's challenge to the Heartland Institute. It is described in the sidebar on page 17.

Conclusion

Lindsay concluded the conference Sunday morning on a moving note, describing the recent history, role, and future of the Center for Inquiry as he sees it. His brief remarks are published as a special essay on page 35. It was a fitting end to a stimulating conference that took us back to the founding roots of the modern skeptical movement, examined where we are now, and looked ahead to the challenges to come. ■

Kendrick Frazier is editor of the Skeptical Inquirer. He is both a board member of CFI and a member of the Executive Council of CSI. All photos by Brian Engler.

year. The challenge will be settled using the NASA GISS mean global land surface temperatures for the conventional climate averaging period (defined by the World Meteorological Organization as 30 years) ending on December 31, 2015. If the global average temperature does not exceed the mean temperature for an equal period ending on the same date in any previous year for which complete data exist, CSI will donate $25,000 to a nonprofit to be designated by Heartland. Otherwise, Heartland will be asked to donate $25,000 to a science education nonprofit designated by CSI. It is CSI's intent to repeat this challenge every year for the next 30 years.

"The theme of Heartland's climate conference was 'Fresh Start,'" observed Lindsay. "By predicting that a new record average temperature will be set every year for the next 30 years, we are in effect giving them 30 'fresh starts.' I fear that what we'll all find, however, is that as temperatures rise and the crisis deepens, each 'fresh start' will grow more and more stale."

Last December, fifty-two fellows of CSI—which includes noted scientists, journalists, and other luminaries such as Bill Nye, Ann Druyan, Richard Dawkins, David Morrison, Sir Harold Kroto, Joe Nickell, Eugenie C. Scott, and Lawrence Krauss—signed and circulated a widely noted open letter, drafted by Boslough, calling for the news media to refrain from referring to those who deny the scientific consensus on climate change as "skeptics." Learn more at http://bit.ly/SkepticsDeniers.

The Executive Council of the Committee for Skeptical Inquiry held a public skeptic track session at the conference Sunday morning, prior to its business meeting that afternoon. From left: Leonard Tramiel, Dave Thomas, Ray Hyman, Eugenie C. Scott, Ken Frazier, Harriet Hall, Scott Lilienfeld, Amardeo Sarma, Steve Novella, and Barry Karr.

Dawkins Delights in Live On-Stage Interview

One of the big highlights, which brought in additional, one-day-only registrants to a fully opened ballroom for a Saturday evening event, was a public on-stage interview with famed zoologist and author (and CSI fellow) Richard Dawkins. (At the awards banquet the evening before, CFI President Ron Lindsay had presented Dawkins with CFI's Lifetime Achievement Award.)

In the Saturday night event, Josh Zepps, cohost of CFI's *Point of Inquiry* podcast, conducted the eighty-minute interview. Dawkins was in good form as usual as they roamed over a wide range of topics.

Here are a few points Dawkins made:

- He likes his book *Unweaving the Rainbow* (Zepps had said it was his favorite Dawkins book) because it is the only one he has written that deals with literature. It speaks of the poetry of science and responds to Keats who mistakenly saw science as diminishing, not increasing, one's sense of wonder about the world.

- "Don't let anyone say 'Catholic child' or 'Muslim child,'" Dawkins said. "We have to break the automatic assumption that religion is automatically transmitted like genes down to the next generation. . . . You don't say 'postmodernist child' or 'Keynesian child.'"

- Is he "spiritual"? "I wouldn't use that word," Dawkins said, "but . . . I get an almost mystical feeling when I contemplate the Milky Way" or the microscopic world within us. . . . "I take my stand against any kind of supernaturalism." He called supernaturalism "an incoherent concept" and "an evasion." He particularly struck out against the way society tends to hold up "faith" as a high and praiseworthy thing. "Faith without evidence is regarded as a virtue. Faith is very, very dangerous. Educating children to have faith is a very wicked thing to do. Faith is a menace and one of the great evils in this world."

- A related problem is exempting religion from criticism, including criticism of radical Islamic sects that approve and even direct the killing of those who don't share their brand of religion. "The liberal left in Europe and the U.S. has betrayed its own principles bending over backwards because of the fear of being thought Islamophobic," Dawkins said.

- On our treatment of animals: He referred to "our species-ist morality" and emphasized, "There is no deep, fundamental principle that separates humans and chimpanzees." He would like to give rights to sentient beings. But he quickly pointed out that that doesn't apply to embryos, that being species-ism: "A human embryo is not sentient."

- Are he and other prominent New Atheists "militant" atheists? "I prefer not to say we're militant. I prefer to say we are rational."

- Does he have free will? Dawkins thought about that carefully. "I give Christopher Hitchens's answer to the question of do I have free will: 'I have no choice.'"

Richard Dawkins is interviewed live on stage by CFI *Point of Inquiry* podcast cohost Josh Zepps.

The audience awaits the highly anticipated live interview with Richard Dawkins.

Dawkins particularly struck out against the way society tends to hold up "faith" as a high and praiseworthy thing.

'The War against Scientific Illiteracy Continues'

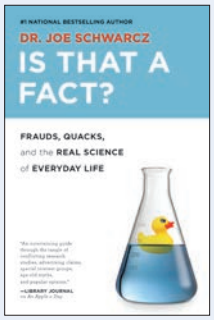
JOE SCHWARCZ

Below are remarks prepared by Joe Schwarcz, director of McGill University's Office of Science and Society, accepting the Committee for Skeptical Inquiry's $2,500 Robert P. Balles Prize in Critical Thinking for his 2014 book* Is That a Fact?: Frauds, Quacks, and the Real Science of Everyday Life *(ECW Press, Toronto). The award was presented at the CFI "Reason for Change" awards banquet on June 12 by Kendrick Frazier. He called Schwarcz "a master public science educator" and* Is That a Fact? *"a wonderful book" with seventy-two separate, short pieces, "all witty, direct, knowledgeable, informed by good science." He read Schwarcz's acceptance remarks (below) in his absence due to a family medical emergency.

I would like to thank everyone at the Committee for Skeptical Inquiry for this recognition and am extremely sorry that I cannot be there to accept the Balles Prize. Unfortunately, last week a lightning bolt struck out of the blue and we are in the midst of meeting a large medical challenge with my wife. Had I been able to attend, I would have entertained the audience with stories of my battles with the "Food Babe" and other scientifically illiterate bloggers. And I would have described how scientific illiteracy jump-started my career.

Way back in 1980, two colleagues, Drs. David Harpp and Ariel Fenster, and I were approached to mount some sort of a science display at the annual "Man and His World" exhibition, a descendant of Expo 67, the hugely successful Montreal World's Fair. One of the featured demonstrations was the making of some polyurethane foam. This involved mixing two reagents in a cup and generating, within minutes, a mountain of foam that hardened into a mushroom-shaped blob. It was a neat demo. We had a lot of fun with it until a fly fell into the ointment one Monday morning. I remember it well.

I picked up my morning newspaper and began to glance through it in the usual fashion. The "city column" immediately got my attention because it was all about our chemical escapades. It described how in spite of the great anxiety about urea-formaldehyde foam insulation, some chemists were brewing the stuff in public and were singing its praises. Well, that got me more than a little hot under the collar. True, there was concern at the time about urea-formaldehyde, an insulating material which can release toxic formaldehyde if improperly applied. But we were not dealing with urea-formaldehyde! We were demonstrating the properties of polyurethane, a distinctly different material. The only common feature was that these were both foams.



By nine o'clock that morning, I had delivered a letter to the newspaper, along with a large egg formulated out of polyurethane, which I suggested the columnist hang around his neck for penance. After all, he had laid a large egg by not appreciating the difference between urea-formaldehyde and polyurethane! He had also created unnecessary concerns. Much to his credit, the columnist wrote a "mea culpa" retraction, explaining that he had leaped to an inappropriate conclusion because of his scientific illiteracy. I was satisfied, and thought the case to be closed. But then I got a call from a local radio station asking if I would like to comment on this controversy—which of course was really a non-controversy. They must have liked the way I explained the matter because a couple of weeks later I was again asked to go on air and discuss some chemistry related issue that had arisen. Soon this evolved into a series of spots and eventually culminated in a regular weekly phone-in show titled "The Right Chemistry," which continues to this day.

The radio program spawned requests to give public lectures, numerous television appearances, and invitations to write newspaper columns and books. Finally, all these activities were centralized in 1999 with the creation of the McGill Office for Chemistry and Society, a unique university-based venture aimed at increasing the understanding of and the appreciation for science among the public. Our goal is to provide accurate, unbiased scientific information on various issues of public concern, and we welcome all kinds of queries about scientific matters, particularly those pertaining to everyday life.

Interacting in this fashion with the public over so many years has been a fascinating, exciting, fulfilling, and sometimes frustrating experience. Above all, it has afforded insight into the public's fears, concerns, hopes, and dreams, both rational and irrational. Anyone in this business quickly realizes that there are numerous misconceptions about science out there that need to be addressed. It also becomes painfully clear that whenever science cannot provide an adequate answer, charlatans rush in to fill the void. The war against scientific illiteracy continues. I don't think we can win it, but we can win some battles.

Thanks again for this amazing award.

Joe Schwarcz is director of the McGill Office for Science and Society, Montreal, Quebec, Canada.

The Pope's Encyclical on Climate and the Planet: Will It Change the Debate?

KENDRICK FRAZIER

Pope Francis's encyclical on "caring for our common home" set off a frenzy of discussion and reaction that most science-minded people welcome. Especially so since this much-anticipated document comes from a globally known and respected figure (polls show he is one of the most trusted persons in the world) who has already shown abundant signs of his intention not only to shake up the Catholic Church hierarchy but also to address larger planetary issues that affect everyone.

This one deals with the degradation of our planet—including pollution, loss of biodiversity, and the problems of human-caused climate change. Francis, quite remarkably, provides a scientific-ecological perspective, noting the interrelationships of different forms of life on the planet, not just humans and other mammals but down to "fungi, algae, worms, insects, reptiles and an innumerable variety of microorganisms." He calls for "a new dialogue about how we are shaping the future of our planet."

Francis, a Jesuit (the most science- and intellectual-minded Catholic order), has had some scientific training, and he sought scientists' advice. It shows in this document. He is aware of the scientific evidence for how we are changing the climate and accepts it. He goes on beyond that to speak of addressing these global problems as a moral issue that confronts us all.

The overarching issue he addresses is the misconceived notion that man has "dominion" over the Earth rather than responsibility as its stewards.

A *Washington Post* article said the encyclical reads in many places like a scientific document, commenting that "It is sort of a combination between Saint Augustine and a National Academy of Sciences report."

True, the document may well be the most scientifically oriented papal encyclical, but the language in much of it is nevertheless largely theological and couched in moral terms. That should only be expected. And that is part of its power. But Francis's forthright understanding and acceptance of the insights of modern science inform the document throughout.

Several key excerpts from the encyclical appear in the box on the next page.

How should scientific skeptics, many of whom have serious reservations about religion, feel about this? They have been generally welcoming regarding the document's scientific content and appeals, but not so fully toward other aspects. The pope had an opportunity here to address one big root cause of all these issues—unrestrained population growth and a need for birth control and family planning to slow these increasingly severe pressures

Key Excerpts from the 'Climate' Encyclical

- Although change is part of the working of complex systems, the speed with which human activity has developed contrasts with the naturally slow pace of biological evolution. Moreover, the goals of this rapid and constant change are not necessarily geared to the common good or to integral and sustainable human development.

- The climate is a common good, belonging to all and meant for all. At the global level, it is a complex system linked to many of the essential conditions for human life. A very solid scientific consensus indicates that we are presently witnessing a disturbing warming of the climatic system. In recent decades this warming has been accompanied by a constant rise in the sea level and, it would appear, by an increase of extreme weather events, even if a scientifically determinable cause cannot be assigned to each particular phenomenon. Humanity is called to recognize the need for changes of lifestyle, production and consumption, in order to combat this warming or at least the human causes which produce or aggravate it. It is true that there are other factors (such as volcanic activity, variations in the earth's orbit and axis, the solar cycle), yet a number of scientific studies indicate that most global warming in recent decades is due to the great concentration of greenhouse gases (carbon dioxide, methane, nitrogen oxides, and others) released mainly as a result of human activity. Concentrated in the atmosphere, these gases do not allow the warmth of the sun's rays reflected by the earth to be dispersed in space. The problem is aggravated by a model of development based on the intensive use of fossil fuels, which is at the heart of the worldwide energy system. Another determining factor has been an increase in changed uses of the soil, principally deforestation for agricultural purposes.

- Warming has effects on the carbon cycle. It creates a vicious circle which aggravates the situation even more, affecting the availability of essential resources like drinking water, energy and agricultural production in warmer regions, and leading to the extinction of part of the planet's biodiversity. The melting in the polar ice caps and in high altitude plains can lead to the dangerous release of methane gas, while the decomposition of frozen organic material can further increase the emission of carbon dioxide. Things are made worse by the loss of tropical forests which would otherwise help to mitigate climate change. Carbon dioxide pollution increases the acidification of the oceans and compromises the marine food chain. If present trends continue, this century may well witness extraordinary climate change and an unprecedented destruction of ecosystems, with serious consequences for all of us. A rise in the sea level, for example, can create extremely serious situations, if we consider that a quarter of the world's population lives on the coast or nearby, and that the majority of our megacities are situated in coastal areas.

- Climate change is a global problem with grave implications: environmental, social, economic, political and for the distribution of goods. It represents one of the principal challenges facing humanity in our day. Its worst impact will probably be felt by developing countries in coming decades. Many of the poor live in areas particularly affected by phenomena related to warming, and their means of subsistence are largely dependent on natural reserves and ecosystemic services such as agriculture, fishing and forestry. They have no other financial activities or resources which can enable them to adapt to climate change or to face natural disasters, and their access to social services and protection is very limited.

- It may well disturb us to learn of the extinction of mammals or birds, since they are more visible. But the good functioning of ecosystems also requires fungi, algae, worms, insects, reptiles, and an innumerable variety of microorganisms. Some less numerous species, although generally unseen, nonetheless play a critical role in maintaining the equilibrium of a particular place. Human beings must intervene when a geosystem reaches a critical state. But nowadays, such intervention in nature has become more and more frequent. As a consequence, serious problems arise, leading to further interventions; human activity becomes ubiquitous, with all the risks which this entails.

on the global environment. He chose not to do so, and that earned some deserved criticism.

"There is one very practical measure, immediately realizable and eminently feasible that is, as it were, staring the pope right in the face," Center for Inquiry President and CEO Ronald A. Lindsay wrote in a *Huffington Post* blog. "The pope should not only end the Catholic Church's morally absurd and repugnant opposition to contraception, but should urge all families to engage in responsible family planning."

Physicist and CSI Fellow Lawrence Krauss lauded the scientific and empirical sections of the encyclical, which he compared favorably to a report of the Intergovernmental Panel on Climate Change (IPCC).

He also praised its emphasis on how the impacts of climate change are disproportionately affecting the poorest parts of the world and thus those least able to make adaptions. Krauss called these "timely and welcome remarks by someone who is viewed as a spiritual guide by billions of Catholics."

"Francis ruminates poetically on the nature of man, the mystery of the cosmos (my own area of study) and the special duty Christians have to respect nature, humanity and the environment," wrote Krauss in his blog on ScientificAmerican.com. "It's beautifully presented and sounds good in principle. However, his biblical analysis leads to the false conclusion that contraception and population control are not appropriate strategies to help a planet with limited resources."

NASA planetary scientist David Morrison, a CSI fellow and SI contributing editor, was more positive overall: "I welcome the papal statement on environmental stewardship and the threat posed by climate change," he told the Skeptical Inquirer. "I am not a Catholic or a Christian, but I realize how widely respected Pope Francis is. We should put aside the parts of the encyclical that might offend us and focus on his message about global warming. Climate change is such an overriding threat to our future that we need to work with allies from a broad spectrum of belief systems."

Recent social science research shows that people tend to base their acceptance or nonacceptance of certain areas of science not so much on any assessment of the evidence but according to whom they trust—or don't trust.

Recent social science research shows that people tend to base their acceptance or nonacceptance of certain areas of science not so much on any assessment of the evidence but according to whom they trust—or don't trust. People who may not personally know any scientists or, for whatever reason, suspect certain scientific statements, may accept scientific information from a trustworthy figure who is not a scientist—in this case a noted religious leader. From a scientific viewpoint, that obviously is not the ideal situation, but it is a fact of reality.

Joshua Rosenau of the National Center for Science Education, which added climate change to its science mission a few years ago, told SI:

> People have just about always seen such questions through a religious lens, or at least through a lens of ethics and philosophy—if the former isn't a subset of the latter. People reject science that they think is at odds with their philosophical or ethical or religious principles, so we might hope that the encyclical opens up more people to accepting the science. More importantly, it should motivate more people to take the necessary actions.
>
> To me the irony lies in the surprising number of people (myself included) who would normally not give a fig what the Pope thinks, who have nonetheless been gearing up for the encyclical with such anticipation. And the number of people, on the other hand, who normally use papal proclamations as a cudgel to advance their political agenda who have suddenly decided that politics and religion should never ever overlap.

This was a reference to several Republican presidential candidates, including Marco Rubio and Jeb Bush, who are Catholic and have questioned or denied the established science of human-caused climate change. Clearly the encyclical has made them squirm.

"I hope I'm not going to get castigated for saying this by my priest back home, but I don't get economic policy from my bishops or my cardinals or my pope," Bush, the Florida governor, was quoted as saying in a *New York Times* news article on the encyclical. "And I'd like to see what he says as it relates to climate change and how that connects to these broader, deeper issues before I pass judgment. But I think religion ought to be about making us better as people and less about things that end up getting in the political realm."

The Skeptical Inquirer invited noted Brown University professor of biology Kenneth R. Miller to share his thoughts with SI readers. Miller is a Committee for Skeptical Inquiry fellow and a strong and effective advocate for evolution. He is also a Roman Catholic. His comments appear in the accompanying essay "Is the Pope Catholic?" ■

The Skeptical Inquirer asked noted biologist and CSI Fellow Kenneth R. Miller, a Roman Catholic, for his take on the encyclical.

Is the Pope Catholic?

KENNETH R. MILLER

We all know the answer to the world's most obvious question, which is "yes, of course." But Pope Francis's new encyclical, *Laudato Si'*, is Catholic twice over: "Catholic" in the religious sense to be sure, but also "catholic" in the sense of universal. Much of his writing is directed toward an audience within the Church, but unlike many papal encyclicals, it aims to set the agenda for a discussion of issues that envelop the entire planet.

The striking coherence of Francis's young papacy runs throughout this document. A scientifically trained Jesuit who took the name of Saint Francis of Assisi, this pope has woven the beautiful language of his namesake into a narrative that speaks of science, economics, social justice, and human dignity. Francis displays an impressive understanding of the depths of environmental degradation loosed upon the world by the technological age. While offering strong support to those who see this crisis in purely human and social terms, he Christianizes the issue in powerful language, quoting Eastern Orthodox Patriarch Bartholomew that "to commit a crime against the natural world is a sin against ourselves and a sin against God." Nonbelievers may see no need for such language, but it is essential to the pope's message in every sense. Acutely aware that many Christians have taken the creation story of the Bible to justify human "dominion" over the Earth and its creatures, he roundly rejects that viewpoint. The true Christian message is stewardship, not dominion, and Francis drives home the lesson that "the Bible has no place for a tyrannical anthropocentrism unconcerned for other creatures." Amen.

The Gospel of social justice, which we have seen in other messages from this pope, is everywhere in *Laudato Si'*. To Francis, the "cry of the earth" and the "cry of the poor" are one. This non-European pope knows firsthand the slums and slag heaps of the developing world and realizes that unconcern for the environment is but a cynical extension of unconcern for our fellow human beings. As such, this encyclical is a profoundly political document as well as a scientific one. Along those lines, it is particularly striking to hear some critics already insisting that Francis should stick to "religion" and keep his nose out of science. Unlike most of his climate-denying critics, I have no doubt that Francis actually understands the meaning of an infrared absorption spectrum, knows the difference between methane and carbon dioxide, and has a firm grasp on the forces that drive long-term climate change. Indeed, a deep respect for science and scientific reasoning is at the very heart of this encyclical, something that may surprise those who see faith as the antithesis of science. To Francis, faith in the rationality of creation is the very basis of science itself, a point that should not be missed by those who might otherwise dismiss pronouncements from the Chair of Peter.

It is true that many have expressed disappointment at the fact that Francis has not yet corrected Pope Paul VI's tragic error with respect to contraception. I am disappointed as well. More than four-fifths of American Catholics regard birth control as morally acceptable, and the Church's stance on this issue has only exacerbated environmental problems in many areas of the world. But to expect such a profound reversal of teaching in a document devoted to the environment would be politically naive. Had the pope in fact done so, reaction within the Church would now be focused entirely on the issue of contraception, and the encyclical's profound environmental statements would be all but ignored. I do not pretend to know whether Francis will be able to collect the wisdom and strength to revisit this critical issue in the remainder of his papacy. But I do know that by issuing this encyclical he has forever placed the Catholic Church, with respect to the Earth's environment, on the side of the angels. ■

To Francis, faith in the rationality of creation is the very basis of science itself, a point that should not be missed by those who might otherwise dismiss pronouncements from the Chair of Peter.

Kenneth R. Miller is professor of biology and Royce Family Professor for Teaching Excellence at Brown University, Providence, Rhode Island. His books include *Only a Theory: Evolution and the Battle for America's Soul*, *Finding Darwin's God*, and *Biology by Miller & Levine*, the nation's leading high school biology textbook.

Joe Nickell, PhD, majored in art and English for his undergraduate work at the University of Kentucky, and his later graduate studies in literary investigation included folklore (both coursework and independent studies) and iconography (under Guy Davenport)—subjects frequently addressed in his many investigative books.

The Black Madonna: A Folkloristic and Iconographic Investigation

One of the most famous of true icons (traditional religious panel paintings) is the so-called Black Madonna of Czestochowa, Poland (Figure 1). Its notoriety was boosted when, following his election to the papacy, the "Polish Pope" John Paul II prayed before it on a visit in 1979. For an international History Channel series, *Miracles Decoded*, I was asked to look into the icon's origins. I found that it has an intriguingly legendary history, an iconography that repays study, and a reputation for many miracles.

Figure 1. The Black Madonna of Czestochowa, Poland, is the subject of many pious legends.

Folkloric Origins

According to legend, the panel for the dark-skinned Madonna and Child came from a table that had been made by Jesus himself while apprenticing to his carpenter father, Joseph. After Jesus's crucifixion, his mother allegedly took the table with her when she went to live in the home of a disciple, St. John. Upon the top of this, according to fanciful tradition, St. Luke himself painted her portrait. It was subsequently discovered by Helena, the mother of Roman emperor Constantine the Great (274–337 CE), among a remarkable group of treasures on a trip to Jerusalem—or so it is said in pious tales (Aradi 1954, 62; Mullen 1998, 135).

The locations of the reputed treasures were allegedly revealed to the then almost eighty-year-old Helena by divine visions. She is said to have uncovered nothing less than the Holy Sepulchre and found that it not only contained the True Cross of Jesus but that it was an incredible storeroom of Christian artifacts. In addition to the *Titulus Crucis*—the Cross's headboard (on which was inscribed, in three languages, "This is the King of the Jews" [Luke 23:38])—the disciples had thought to include the crosses of the "two thieves" crucified with Jesus (Mark 15–27). As well, there were nails from the crucifixion, the crown of thorns (Matthew 27:29), the chalice known as the Holy Grail, and more (Nickell 2007, 57, 77–95, 102). There, or elsewhere, she supposedly found the table-top portrait.

In other words, no one had any idea where such bogus items actually came from. The claimed *Titulus*, for example, has been radiocarbon-dated not to the first century but to 980–1146 CE, fully consistent with the actual time (1144–1145 CE) it had been acquired by a church in Rome. As to the True Cross, fragments were distributed as relics so frequently, noted Protestant John Calvin (1543, 67), that there were enough for "a whole ship's cargo." A supernatural explanation was provided by St. Paulinus of Nola (353–431 CE), who claimed that no matter how many pieces were removed, the cross never diminished in size! (See Cruz 1984, 39.) One piece has been radiocarbon-dated to 1018–1155 CE (*Finding Jesus* 2015).

Nevertheless, continues the Black Madonna saga, Helena returned with the picture to Constantinople, where it remained in a church until the eighth century. Then, threatened by war, it was carried for safekeeping to (curiously enough) Eastern Poland. In 1382 the Tartars invaded but failed to discover the Holy Virgin's portrait because "a mysterious cloud enveloped the chapel."

Later, a local prince "was ordered in a dream by an angel to take the picture to an insignificant, obscure village named Czestochowa" (Aradi 1954, 63).

A contradictory legend tells how the icon was being transported for safekeeping when it was stored overnight in Czestochowa's monastery of Jasna Gora. On the following morning, when the image was returned to the wagon, the horses refused to move—a miraculous sign, it was thought, that it should remain there (Mullen 1998, 135–136). In yet another tale, the balking horses are those of invading Hussites who in 1430 were attempting to take the icon as plunder. When the horses unaccountably stopped at the village limits, however, and no amount of beating could get them to move, the Black Madonna was abandoned (Aradi 1954, 63). Such *variants* (differing versions of a narrative), together with common *motifs* (story elements), are indicative of the folkloric process at work.

In the latter tale, the Hussites were so riled that they angrily grabbed up the icon, which had already been pierced by an arrow in the Madonna's throat during the siege, and cast it on the ground, where it broke into three pieces. Moreover, one of the thieves struck the image with his sword, inflicting two gashes. As he started to strike a third time, he fell down and writhed in agony until his death (Cruz 1993, 400). It must have been embarrassing to the faithful that the icon—reputed to protect all of Poland (Aradi 1954, 63–66)—could not even protect itself. It could, however, inspire a tale about how it nevertheless exacted retribution.

A further magical tale relates that after the Holy Picture was abandoned by the Hussites and found covered in dirt and blood, the monks wanted to clean it. However, all the wells were dry from putting out the fires set by the invaders' torches. Therefore, "It was at this time that a miraculous fountain sprung up, a spring that has since healed thousands and thousands of sick and has supplied water to millions of pilgrims" (Aradi 1954, 63; for a discussion of "miracle" healings see Nickell 2013, 175–222).

As we shall see presently, there were many black Madonna icons that were claimed to be the original. According to Scheer (2002, 1421–1422), "All share a common set of recurring motifs." These include "the refusal of an image to leave a certain spot," "the resistance to or revenge taken for damage or 'wounding,'" and others. She adds: "Only one motif can be said to come up relatively often in connection with black madonnas: that of the prestigious artist—in most cases, St. Luke the Evangelist."

Iconography

There are as many as perhaps a few hundred black Madonnas in Europe. In addition to small statues (commonly about thirty inches tall and mostly of polychromed wood), they consist of icons either imported from Byzantium (which Constantine renamed Constantinople) or rendered in Byzantine style. This style was influential across Europe for a millennium, and in icon painting it continued until the seventeenth century, traces of it surviving in paintings by El Greco (ca. 1545–1614). Byzantine-style icons were produced in quantity in Italy during the thirteenth and fourteenth centuries (Scheer 2002, 1413–1416; Levy 1962, 25).

Byzantine-style icons were produced in quantity in Italy during the thirteenth and fourteenth centuries.

Now, distinctly Christian images had begun to appear about 200 CE. By the beginning of the fifth century there had developed "a cult of portraits of saints, including the Virgin," in different parts of the Christian Empire (Grabar 1968, 7–30, 84). Apparently the earliest icon of Mary reputedly painted by Luke was a large circular portrait of her head only. Its circular shape is unusual, and it may have indeed been painted on a table top or a semblance thereof. A tradition holds that in the first half of the fifth century it was discovered—not by Helena but (in this variant tale) by Eudokia (wife of Byzantine emperor Theodosius II) and sent by her from Palestine to Constantinople. There it was fitted into a great rectangular full-length picture of Mary holding the infant Christ. It was reportedly this composite that became known as the *Hodegetria* ("She who shows the Way")—a representation of the *Theotokos* ("Mother of God"). In this type, the Holy Mother holds the Christ Child while gesturing to him as the salvation of humankind (Guarducci 1991; Grabar 1968, 84; Hodegetria 2014). As we shall see, this portrait set—now presumed lost (Hodegetria 2014)—probably had dark-complexioned figures. It was doubtless the prototype of subsequent Hodegetria-type "black" Madonnas.

The Black Madonna of Czestochowa is a late evolutionary example of this type.[1] According to anthropologists Leonard W. Moss and Stephan C. Cappannari (1953, 320), it is "distinctly thirteenth to fourteenth century Byzantine in form." Various additional sources agree that it is of "Byzantine origin," that its "Byzantine style is obvious," and so on (Leonard-Stuart and Hagar 1912; Duricy 2013). However, Pasierb (1989, 6) cautions that "In fact even today neither stylistic nor iconographic analyses are of much help." That is because the icon was repainted

in 1434.[2] Pasierb insists that therefore it is only possible to say that it was a prototype of the fifth-century one in Constantinople and therefore "it could have been made some time between the 6th and 14th centuries."

Nevertheless, there are indications that the repainting was faithful to the original (Pasierb 1989, 6), and the image does actually contain a number of iconographic clues relating to its dating. Even as a work of imagination, it is anachronistic for the first century. For example, the infant Jesus holds in his left hand a *codex* (a bound book, as opposed to the earlier scroll), said to be a book of gospels. But there could be no such texts until, decades after Jesus's crucifixion, they were separately written and eventually collected. That did not take place until the late second or even third century CE (Bible 1960; Price 2003, 40), long after the deaths of the supposed painter and his portrait subject.

One motif is of particular interest. The Madonna's blue garment is studded with gold fleurs-de-lis, the lily being symbolic of the Trinity as well as of the Virgin (Webber 1938, 178). The combination of colors and motif also echo the royal French coat of arms—*d'azur, semé de fleurs de lis d'or* ("blue, interspersed with gold lilies")—which was not officially adopted until the twelfth century (Black Madonna 2014; Hall 1979, 124; Fleur-de-lis 1960). From this, it has been suggested that the icon was probably produced at the Jasna Gora monks' founding monastery in Hungary, during the reign of the Anjou dynasty, 1308–1386 (Black Madonna 2014). That time period is supported by the fact that the monastery was established in Czestochowa about 1382 (Leonard-Stuart and Hagar 1912), and the icon arrived there "most probably on 31 August 1384" (Pasierb 1989, 6). I would emphasize that the icon has no provenance before that time.

Art scholar Ernst Scheyer (2013) studied the image and concluded that "the present image was restored in the nineteenth century and painted somewhat darker than previously." This brings us to the persistent question: Why is the Madonna of Czestochowa black? Some have claimed the picture darkened over time—either from the smoke of "innumerable candles" or the age-darkening of pigments used for the skin color (Beissel 1909)—or from the flames and smoke of a burning chapel (Broschart 1961). (In the case of one similar icon restored in 1799, the "thoroughly black" faces of mother and child were attributed to the smoke of centuries after examination of the paint flakes revealed underlying light flesh tones. In his restoration, the artist chose to repaint the faces black because that was what churchgoers expected [Scheer 2002, 1435].)

This [analysis] brings us to the persistent question: Why is the Madonna of Czestochowa black?

An alternate view is that many of the numerous black Madonnas (icons and statues) were intentionally created black (i.e., dark-skinned). That is in fact true of certain Madonnas whose features and skin color match that of the native population—for example, various "Negroid madonnas" in Africa (Moss and Cappannari 1953, 319) and the dark-skinned Image of Guadalupe in Mexico (alleged to have appeared miraculously but in fact painted by an Aztec artist [Nickell 1988, 103–117; 2013, 31–34]). Moss and Cappannari (1953, 324) go further, suggesting that "The black madonnas are Christian borrowings from earlier pagan art forms which depicted Ceres, Demeter, or Isis as black in the color characteristic of those goddesses of the earth."

It may also be true that a dark complexion was simply thought appropriate for a Jewish woman, as one Dominican scholar insisted in the sixteenth century (de Barletta 1571). Also, as early as the sixth century appeared allegedly miraculous self-portraits of Jesus (termed *acheiropoietos* or "not made with hands") that were actually painted (Nickell 2007, 69), and these were likewise dark-complexioned presumably for the same reason (Scheer 2002, 1425, n. 36).

Conclusions

The Black Madonna of Czestochowa is a traditional, Hodegetria icon, of a type that evolved from its probable prototype in fifth-century Constantinople. The claim that it was painted by Luke on a table-top made by Jesus in his father's carpentry shop derives from that prototype—and, of course, is nothing more than pious legend. The image was apparently rendered with original dark flesh tones (there being no evidence that the "black" coloration resulted later from smoke, fires, or the discoloration of age). It is probably of fourteenth-century manufacture, consistent with the lack of provenance before 1384 when the icon appeared at the Jasna Gora monastery.

As to the claims of miracle healings and protection, the sad fact is that it was unable to heal or protect itself—despite the best efforts of further pious legend-making. It does stand as a testament to the faith of its countless devotees.

It remains for the Black Madonna of Czestochowa to be radiocarbon dated. A tiny sample of wood could be taken

from the edge,[3] specially cleaned to remove contaminants, and then subjected to the carbon-dating process—just as was done for the *Titulus Crucis* and piece of the True Cross (albeit with the devastating result of disproving their authenticity). The icon's custodians should commission this test or admit, by their refusal, that their faith in its authenticity is weak. ■

Notes

1. The wood panel measures (without the frame) about 13" wide by 19" high and is nearly ½" thick (Cruz 1993, 401).

2. When the Black Madonna was repainted in 1434, two pen slashes were made to the right cheek to commemorate the previous vandalism (Black Madonna 2014).

3. The back of the panel is illustrated with scenes from its legendary history, rendered in 1682 (Pasierb 1989, 210).

References

Aradi, Zsolt. 1954. *Shrines to Our Lady Around the World*. New York: Farrar, Straus and Young.

Beissel, Stephan. 1909; cited in Scheer 2002, 1418.

Bible. *Encyclopedia Britannica*, 1960. Chicago: Encyclopedia Britannica.

Black Madonna of Czestochowa. 2014. Online at http://en.wikipedia.org/Black_Madonna_of_Czestochowa; accessed January 15, 2014.

Broschart, Charles B. 1961. *Call Her Blessed*; cited in Duricy 2013.

Calvin, John. 1543. *Traite des Reliques*; reprinted in English as *Treatise on Relics* (transl. by Count Valerian Krasinski), Amherst, New York: Prometheus Books, 2009 (with an introduction by Joe Nickell).

Cruz, Joan Carroll. 1984. *Relics*. Huntington, Indiana: Our Sunday Visitor.

———. 1993. *Miraculous Images of Our Lady*. Charlotte, North Carolina: Tan Books.

de Barletta, Gabriel. 1571. Cited in Scheer 2002, 1425.

Duricy, Michael. 2013. Black Madonnas: Our Lady of Czestochowa. Online at http://campus.udayton.edu/mary/meditations/olczest.html; accessed January 2, 2014.

Finding Jesus: Faith, Fact, Forgery. 2015. CNN documentary, episode "The True Cross" aired March 29.

Fleur-de-lis. 1960. *Encyclopedia Britannica*. Chicago: Encyclopedia Britannica.

Grabar, André. 1968. *Christian Iconography: A Study of Origins*. Princeton, New Jersey: Princeton University Press.

Guarducci, Margherita. 1991. *The Primacy of the Church of Rome*. San Francisco, California: Ignatius Press, 93–101.

Hall, James. 1979. *Dictionary of Subjects and Symbols in Art, rev. ed*. New York: Harper & Row.

Hodegetria. 2014. Online at http://en.wikipedia.org/wiki/Hodegetria; accessed January 20, 2014.

Levy, Mervyn, ed. 1962. *The Pocket Dictionary of Art Terms*. New York: Graphic Society.

Leonard-Stuart, Charles, and George J. Hagar. 1912. *Everybody's Cyclopedia*. New York: Syndicate Publishing Co., vol. 2, n.p. (s.v. "Czenstochau" [sic]).

Moss, Leonard W., and Stephen C. Cappannari. 1953. The black Madonna: An example of culture borrowing. *The Scientific Monthly*, June, 319–324.

Mullen, Peter. 1998. *Shrines of Our Lady*. New York: St. Martin's Press.

Nickell, Joe. 1988. *Secrets of the Supernatural*. Buffalo, New York: Prometheus Books.

———. 2007. *Relics of the Christ*. Lexington: University Press of Kentucky.

———. 2013. *The Science of Miracles*. Amherst, New York: Prometheus Books.

Pasierb, Janusz S. 1989. *The Shrine of the Black Madonna at Czestochowa, 3rd ed*. Warsaw: Interpress Publishers.

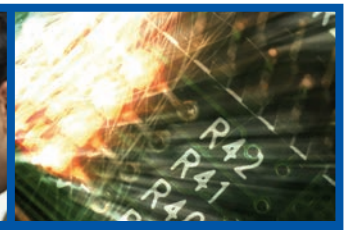
Price, Robert M. 2003. *The Incredible Shrinking Son of Man*. Amherst, New York: Prometheus Books.

Scheer, Monique. 2002. From majesty to mystery: Change in meanings of black Madonnas from the sixteenth to nineteenth centuries. *The American Historical Review*, col. 107, no. 5 (December), 1412–1440.

Scheyer, Ernst. 2013. Quoted in Duricy 2013.

Webber, F.R. 1938. Church Symbolism. Cleveland, Ohio: J.H. Jansen.

SCIENCE AND THE PUBLIC



Earn your master's degree in Science and the Public through the University at Buffalo and the Center for Inquiry!

Explore the methods and outlook of science as they intersect with public culture and public policy. This degree is ideal for enhancing careers in science education, public policy, and science journalism—and prepares you for positions that involve communicating about science.

This unique two-year graduate degree program is entirely online. Take courses from wherever you are in the world at your own pace! Courses include: Science, Technology, and Human Values; Research Ethics; Critical Thinking; Scientific Writing; Informal Science Education; Science Curricula; and History and Philosophy of Science.

Science and the Public
Graduate School of Education & the Center for Inquiry

For details, visit www.gse.buffalo.edu/online/science
Questions? Contact David Koepsell, at dkoepsell@centerforinquiry.net.

Sheaffer's "Psychic Vibrations" column has appeared in the SKEPTICAL INQUIRER for nearly forty years; its highlights have now been published as a book (Create Space, 2011). Sheaffer blogs at www.BadUFOs.com, and his website is www.debunker.com.

The 'Roswell Slides' Fiasco: UFOlogy's Biggest Black Eye

Sometime during 2012, video producer Adam Dew obtained a collection of Kodachrome slides reportedly taken during the 1940s. The slides were said to have been taken by the late Bernard and Hilda Ray, a well-to-do Texas couple who led an active life with much travel and left behind no family. Two of the slides were of particular interest: they seemed to show the body of a small being laid out on a shelf. It looked like it might be an alien, Dew thought. So he contacted "Roswell experts" Donald Schmitt and Tom Carey, authors of *Witness to Roswell*. At that time, those authors were involved in putting together something to be called the "Roswell Dream Team," intended to bring together expert investigators to do a fresh evaluation of the Roswell incident, and hopefully obtain long-elusive proof that the crashed saucer story was real.

UFO investigator Anthony Bragalia was a member of this team, as were Kevin Randle, a prominent Roswell proponent and author of many UFO books, and the Canadian investigator and author Chris Rutkowski. However, the harmonious Roswell dreaming was soon interrupted. Randle and Schmitt had been partners in earlier Roswell investigations during the 1990s. But when it was discovered that Schmitt had falsified his credentials, among other things, Randle denounced him and severed all cooperation. After about twenty years, they were beginning to reconcile when the slides turned up. Randle stuck his toe into the water (or perhaps his whole foot), but didn't like what he saw and withdrew from the effort. (In early 2015, as the slides fiasco gathered intensity and momentum, Randle sent me an email essentially saying, "I hope you realize that I have nothing at all to do with these Roswell slides!" I assured him that I did.) Rutkowski says that he was approached about being a member of the Dream Team, but when he expressed some reservations about the slides, his "membership" offer was withdrawn.

The remaining members of what should now be called the "Slides Team" apparently had no reservations whatsoever. The slides were supposedly being investigated by the best photographic and other experts, who said they appeared to be authentic. The cardboard mountings of the slides were said to prove that they must have been processed during the 1940s. The only problem was that nobody outside that group had actually seen the slides and the details of the supposed investigations were hazy. We were assured that when the time was right and the investigations were complete, this "smoking gun" evidence of the Roswell crash would be released to the world (a theme familiar to veteran skeptics). For about two years, the existence of the slides was known mostly just to those who follow UFO-related blogs and such, and their content was only rumored. As might be expected, curiosity about them was building, along with a properly skeptical "wait and see" attitude. Then at a public forum in November 2014, Tom Carey announced:

> We have come into possession of a couple of Kodachrome color slides of an alien being lying in a glass case. What's interesting is, the film is dated 1947. We took it to the official historian of Kodak up in Rochester, New York, and he did his due diligence on it, and he said yes, this filmstrip, the slides are from 1947. It's 1947 stock. And from the emulsions on the image, it's not something that's been Photoshopped like today. It's original 1947 images, and it shows an alien who's been partially dissected lying in a case.

He described the being as:

> three and a half to four feet tall, the head is almost insect-like. The head has been severed, and there's been a partial autopsy; the innards have been removed, and we believe the cadaver has been embalmed, at least at the time this picture was taken. The owners of the slide—it's an amazing story. The woman was a high-powered Midland, Texas, lawyer with a pilot's license. We think she was involved in intelligence in World War II, and her husband was a field geologist for an oil company.

This was widely reported in the press.

Dew released a professionally produced teaser for his in-production documentary motion picture titled *Kodachrome* to hype the slides. Blurry images of the two slides were leaked,

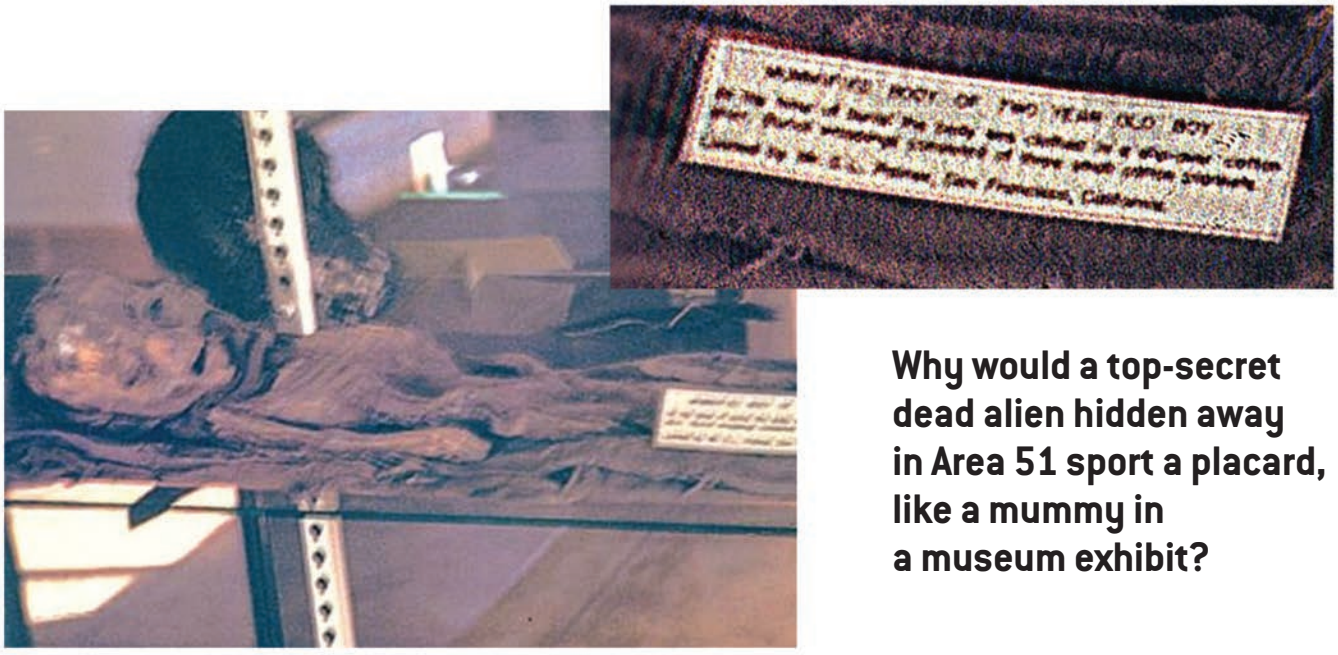
perhaps intentionally. A loosely organized group of independent investigators, calling itself the Roswell Slides Research Group, came together. But it is difficult to investigate something that one is not allowed to see except as a small, low-resolution icon. Anthony Bragalia wrote:

> Of the many scientists, PhDs, photography experts and other researchers who are among the very fortunate to have viewed the "alien slides" – not one has ever at any time mentioned that the 3 foot thing depicted in the 1947 photographs resembles a mummy. This includes KODAK experts, a NASA scientist of international standing who has left comments on his impressions of the creature on this blog and several UFOlogists. The creature depicted in the slides (owned by an Oil Exploration Geologist in NM in the 1940s) in no way even remotely appears like any creature known on Earth. (See http://goo.gl/IfbmOa).

Surprisingly, the "alien" body seems to have a placard on the shelf next to it. Why would a top-secret dead alien hidden away in Area 51 sport a placard, like a mummy in a museum exhibit? What would such a placard say? "Dead alien from Roswell. Top Secret—Don't Tell Anyone!"? Was it possible to read the writing on the placard? Tom Carey said:

> There's a placard, very fuzzy, that can not be legibly read by the naked eye, yet we've had everyone from Dr. David Rudiak, to Studio MacBeth, even the Photo Interpretation Department of the Pentagon, as well as Adobe have all told us that it's beyond the pale, that it cannot be read, it is totally up to interpretation.

A date was finally set to reveal the slides: May 5, 2015, in Mexico City. A big extravaganza was being planned to reveal the slides on the holiday Cinco de Mayo, and it was organized by Mexico's best-known UFO huckster, Jaime Maussan. If the slide promoters were seeking credibility (as opposed to a quick buck), they could not have made a worse choice. A well-known sensationalist journalist, Maussan is Mexico's very own P.T. Barnum, having made a lucrative career peddling dodgy photos and videos of UFOs, alien beings, and the like. He previously promoted a skinned dead squirrel monkey as an alien creature, and even published a photo of what is supposed to be "un caballo en el cielo"—a horse flying across the sky. The Mexican website alcione.org lists "more than 40 frauds of a pseudo-journalist and charlatan," Maussan.



Why would a top-secret dead alien hidden away in Area 51 sport a placard, like a mummy in a museum exhibit?

One of the Kodachrome slides showing a small being on a shelf with a placard next to it.

Maussan hyped the slides shamelessly, promising to reveal a Roswell "smoking gun" on May 5. This was your opportunity to witness an event that would change history! About 6,000 tickets were sold priced between US $20 and $100 (according to Ticketmaster in Mexico); some accounts claim that up to $350 per ticket was paid. Thousands paid $15 or $20 to watch the bilingual event on streaming Internet video (which did not work well, angering many). The Twitter feed of those watching the streaming video (#RoswellSlides) was overwhelmingly negative, with most commenters mocking the presentation.

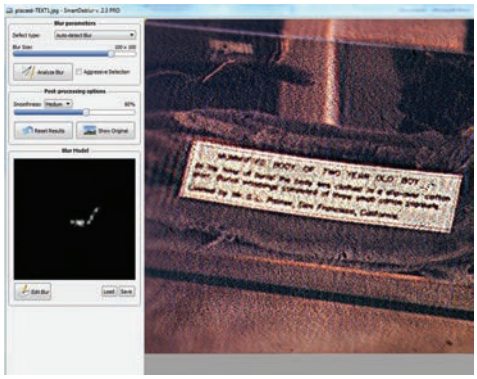
Promises to release high-resolution copies of the slides after the presentation did not materialize. However, at

least one "high enough" resolution copy of the slide showing the placard did leak out. The French skeptic Nab Lator of the Roswell Slides Research Group quickly used the commercial software Smart Deblur to read the placard. The first line clearly read, "MUMMIFIED BODY OF TWO YEAR OLD BOY." Others quickly confirmed that finding. Researcher and satellite orbit guru Ted Molczan commented, "You folks solved in no more than 2-3 days what the promoters claimed not to have been able to solve in 3 years!" Perhaps the slide promoters had an incentive *not* to be able to read the placard.

When the de-blurred copy of the placard was released on the Internet, Dew was furious. He called the Roswell Slides Research Group "a group of internet UFO trolls, claiming to be searching for truth but repeatedly spreading lies." He claimed that they created a "fake placard" using Photoshop and hastily posted a copy of the "authentic" blurred placard on his own website, removing all doubt as to the provenance of the placard image. However, instructions were soon posted by slide debunkers showing how to take the copy of the placard *from Dew's own website*, and de-blur it to read at least the top line in less than two minutes using a trial copy of Smart Deblur. As for Bragalia, he quickly issued a somewhat tepid *mea culpa*, saying "I must be less trusting, more discerning and less accusatory of those with whom I disagree," and he blamed Dew for withholding the high-resolution scans from independent analysis. Considering that Bragalia had earlier called the detractors of the yet-unseen slides "rabid slide-skeptics" and even worse, some think that he has a lot more apologizing to do.

Amazingly, in the same posting in which Bragalia switched sides on this, he claims to have identified the specific mummy trumpeted as the "Roswell alien": it is a child mummy from Native American cliff dwellings in Colorado, at one time on display in a museum in Mesa Verde National Park. About a week later, Donald Schmitt seemed to throw in the towel by saying he had been "overly trusting," but then later made other statements suggesting that the slides might still be genuine. Tom Carey said that the matter "is still open to debate." As of this writing, there is no *mea culpa* from slide promoters Maussan, Dew, and Richard Dolan. Maussan is still insisting that the slides show an alien, and he is joined by other UFO delusionists such as Linda Moulton Howe and Whitley Strieber. The most interesting rationalization thus far comes from Richard O'Connor, MD, who acknowledges that the placard does indeed read "MUMMIFIED BODY OF TWO YEAR OLD BOY," but he says it is a deliberate deception.

So while the fiasco of the Roswell Slides was a huge embarrassment to "Roswell research" and to UFOlogy in general, there were nonetheless some hopeful aspects of it. Many well-known pro-UFO researchers were very skeptical of claimed "smoking gun" photos of unknown origin and content, including Stanton Friedman, Kevin Randle, and Nick Pope. More encouraging still was the excellent cooperation between skeptics and UFO proponents, instead of the usual acrimony. Skeptics such as Tim Printy, Nab Lator, Gilles Fernandez, and Lance Moody worked alongside open-minded UFO proponents such as Paul Kimball, Curt Collins, Isaac Koi, and Chris Rutkowski to cooperatively solve the riddle of the Roswell Slides. Both skeptics and "skeptical believers" agree that the UFO field, as it now stands, is filled to the brim with rubbish. The latter group expects that, when the rubbish is cleared away, there will be a signal in the noise, while the former expects that nothing will be left. But both are natural allies in clearing away UFOlogical rubbish. It also allows us to identify those UFO researchers who are hopelessly mired in delusion and still insist that the "Roswell Slides" do not show a mummy, even after deciphering the placard proclaiming that they do! The real fault line in UFOlogy lies between "UFO realists"—skeptics and skeptical proponents who are willing to look for weaknesses and prosaic explanations for UFO claims—and the "unrealists" who are ready to accept practically any exciting UFO claim on very little evidence. ■



Instructions were soon posted by slide debunkers showing how to take the copy of the placard from *Dew's own website*, and de-blur it to read at least the top line in less than two minutes using a trial copy of Smart Deblur.

[SKEPTICAL INQUIREE BENJAMIN RADFORD

Benjamin Radford is a research fellow at the Committee for Skeptical Inquiry and author or coauthor of seven books, including *Mysterious New Mexico: Miracles, Magic, and Monsters in the Land of Enchantment*.

Playing with Past Lives: The Virginia Boy and the Dead Marine

Q: Have you heard about this recent case of a young boy who says he lived a past life as a Marine? What do you make of it?

—A. Stoker

A: In November 2014, news stories circulated about a four-year-old Virginia boy who was claimed to have had a past life as a Marine killed in 1983. The claim was prompted by his parents and—somewhat disturbingly—profiled on a new reality TV show called *Ghost Inside My Child*. The boy, Andrew Lucas, made comments to his mother suggesting (to her) that he'd lived in a past life and died in a fire many years earlier.

Andrew Lucas, the four-year-old boy who claimed to have a past life as a marine killed in 1983.

Many people believe in reincarnation, from Shirley MacLaine to the Dalai Lama, but there is no scientific evidence for past lives. Usually alleged memories of past lives emerge during psychotherapy or hypnosis when people are encouraged to fantasize about other lives they may have led (often of famous or important people such as Cleopatra or Caesar). Despite many books claiming to offer solid scientific evidence for past lives (such as *Old Souls* by Tom Shroder; *Many Lives, Many Masters* by Brian Weiss; *Reincarnation and Your Past-Life Memories* by Gloria Chadwick, and so on), the evidence is largely anecdotal and falls far short of the mark.

Skeptical research and investigation by authors such as Paul Edwards (in his book *Reincarnation: A Critical Example*) handily debunk most of the "best cases" offered by proponents such as Ian Stevenson and Brian Weiss. Reincarnation remains scientifically unproven largely because those who claim to have had past lives are unable to give historically accurate, provable details from other eras. Other times people glean information from films and television shows and unconsciously incorporate them into their memories in a process psychologists call confabulation.

Bridey Murphy

The most celebrated case of a person claiming to have lived a past life is that of Bridey Murphy. Murphy was a nineteenth-century Irishwoman who Colorado woman Virginia Tighe

claimed to have been in a previous life. Tighe's amazing claim came about in 1952 during a session with amateur hypnotist Morey Bernstein. Under hypnosis—and through an Irish accent—Tighe related memories of her previous existence in the early 1800s in Cork, Ireland, including being born on December 20, 1789, her life and marriage, and death in 1864. At first glance, Tighe's story seemed very compelling. She had never been to Ireland and presumably could not have known many of the details she remembered except by having lived them a century earlier. Bernstein wrote a best-selling book about the case, and Bridey Murphy became a worldwide sensation.

The story of Bridey Murphy began to collapse when investigative journalists went to Ireland to verify Tighe's story. While a few general statements were proven true, the researchers found virtually no evidence for the vast majority of Tighe's "memories." There were no records of a Bridey Murphy who had been born or died on those dates; the people Tighe said she encountered as Bridey Murphy, including Murphy's husband, never existed. And so on.

It seems that Bernstein and his publishers, in their rush to exploit the case for fame and profit, had neglected to check Bridey Murphy's account against the historical facts. It was later revealed that as a young child Tighe had spent time with an Irish immigrant neighbor (not coincidentally named Bridie Murphy), from whom she likely picked up a few details about Ireland, along with an exposure to an Irish accent. Few people believe Tighe purposely faked the story; more likely, she simply (and unconsciously) created it using her imagination and scraps of early memories. Decades of psychological research has demonstrated that people under hypnosis can create realistic, detailed, first-person accounts of events they never experienced. The person comes to believe their own fantastic fictions, often under the encouragement of misguided therapists. The same psychological process helps explain many "eyewitness" alien abduction stories.

Decades of psychological research has demonstrated that people under hypnosis can create realistic, detailed, first-person accounts of events they never experienced.

Andrew Lucas and Val Lewis

In the case of Andrew Lucas, his parents believe he has factually reported the death of "U.S. Marine Sgt. Val Lewis [who] died in a bombing explosion October 23, 1983 in Beirut, Lebanon. Yet 4-year-old Andrew, who lives in Virginia Beach, remembers it as his death. 'He just starts crying hysterically and I say "What's wrong Andrew?" and he says, "Why did you let me die in that fire?" says Michele Lucas, Andrew's mother. . . . Michele says he is saying things and recalling memories that no one his age should know" (Ciara 2014).

How could Andrew be remembering things that never happened to him? The most likely explanation is that he isn't remembering anything unusual at all. There are several red flags suggesting that Andrew's "memories" are not evidence of a past life but instead misunderstood or over-interpreted comments. When Andrew asked his mother, "Why did you let me die in the fire?" she interpreted it as a question coming not from her four-year-old son but instead from Sgt. Lewis. Yet Sgt. Lewis was a twenty-eight-year-old Marine, so why would he be asking Michele Lucas (who he'd never met and who wasn't there at the time of his death) why she "let" him die in a bombing? Andrew is clearly speaking as a young boy to his mother, not as an adult military officer.

Andrew also mentioned an address on Main Street in Sumter, Georgia. The Lucases were unable to find anything confirming their son's information and reached out to the producers of the TV show about ghost-haunted children. They then found several possible "matches" for Andrew's information, including Sgt. Lewis.

The origin of this story isn't hard to decipher when you examine the many clear examples of flawed investigation techniques used by Andrew's parents and the producers. For example, at one point Andrew is shown large photographs of six soldiers who served with Sgt. Val Lewis and died in the same bombing. His mother then asks Andrew, "Were these your friends?" Andrew nods and says yes. "Which one was your friend? Which one were you friends with a lot?" his mother asks. The four-year-old replies, "I was friends with them, a lot—all of them." (It may be significant that Andrew parrots back the same phrase his mother uses in her question to him, "a lot," suggesting that he is taking cues from her.)

Andrew also notes that the photos of the people he was shown are dead. He may have been tipped off by his mother's use of the past tense when referring to them ("were they your friends?") but at any rate this information, even if it were truly coming from the ghost of Sgt. Lewis, raises other questions, such as how Lewis could know that all the other Marines caught in the same blast had also died. After all, just because he was killed doesn't mean that others nearby might not have survived their

Continued on p. 62

The Future of the Center for Inquiry

Fostering critical thinking across the board is the fundamental mission of CFI. The need is greater than ever. We will be there.

RONALD A. LINDSAY

Before I begin my discussion of our organization's future, I have some questions. After all, this is the Center for Inquiry.

How many of you have heard of the American Civil Liberties Union, or the ACLU? How about Doctors Without Borders? Same question for Amnesty International. How many have heard of Amnesty International?

Okay, now I have some follow-up questions. How many of you can name the executive director of the ACLU? How many of you can name the international president of Doctors Without Borders? How about the U.S. executive director for Amnesty International?

So, most people are familiar with these organizations but cannot name their current leaders. These responses are not unexpected and confirm the point I'm about to make. All these organizations are well known. All these organizations are considered successful. To me, your responses indicate that a truly successful nonprofit organization is known for its work, for its ability to achieve the objectives of its mission, and *not* for those who happen to be leading the organization at a certain point in time.

This is the sort of status or reputation that CFI should be aiming for. And it is the status that I've tried to begin to obtain for the organization during my tenure. I think it can be a detriment to an organization if it is too strongly identified with one individual. There may be some short-term advantages to such an approach—depending on the individual—especially perhaps with respect to name recognition. But in the long term this cannot be a good strategy because, among other things, what happens when that individual is no longer around or is no longer fit to lead? Moreover, skeptic or secular organizations should be especially leery of building an organization around one individual as such an approach is antithetical to our philosophy. We are the ones who don't believe there is anybody who has God-given authority to make decisions for us, who can tell us what to do; we think the idea of deferring to a pope or bishop or ayatollah or chief rabbi is preposterous, so it's a bit ironic if we build organizations around a cult of personality.

I've been accused of a number of different things while I've been president of CFI. I've been accused of carrying out some sort of coup to obtain this position. I've been accused of being both a militant atheist and of being an accommodationist with respect to religion; I've been accused of being both a socialist and a libertarian; and, of course, I've been accused of being unwilling to stand up for the rights of men and of hating women. But I think it's safe to say that no one has accused me of trying to create a cult of personality. I have my doubts about whether I would've been successful if I tried, but in any event, I had no desire to do so. I find personality cults repugnant.

Moreover, one of the strengths of CFI is that it has so many talented people on whom it can rely. One of the

A truly successful nonprofit organization is known for its work, for its ability to achieve the objectives of its mission, and *not* for those who happen to be leading the organization at a certain point in time.

first things that struck me after I became president was how underutilized our staff and volunteers were in terms of gaining public recognition for the organization. I made it clear that although as president I obviously would be the lead spokesperson for the organization on many occasions, I wanted other staff to act as spokespersons, to be quoted in press releases, to get on the road to make speeches, go to conferences, meet our donors, meet our supporters, and so forth. And in fact, Debbie Goddard, Tom Flynn, Michael De Dora, Nick Little, Paul Fidalgo, Ben Radford, and others, including our world-renowned investigator, Joe Nickell, have done just that. In addition to our staff, we also have great resources among our directors and our associated fellows, many of whom are among the most distinguished scholars in their fields. We are not an organization composed of one individual; we are an organization of many skilled individuals with expertise in their particular areas who work in collaboration with a core of committed donors and supporters to advance our mission. *We are an institution*, and although the Center for Inquiry may not be a household name yet, that is something I'm confident we can achieve.

As you may have guessed, one reason I'm discussing the topic of leadership is that there is a transition coming soon. I think most everyone is aware I will be leaving CFI at the end of the year. But there's every reason to expect this transition will be smooth. This organization is on solid footing—thanks to you, our supporters, and thanks to our superb staff. This organization did not fall apart when its first leader departed, somewhat abruptly, and it is not going to fall apart now.

And that is a good thing, not just for the survival of the organization but for our society, for our world. The mission of CFI is as vital as it ever was—maybe even more so.

Some may dispute this because they think that organized religion is on its way out, that it is fading away on its own. It is true that more and more people are simply unwilling to accept the doctrines and myths of religion, especially fundamentalist religion. What need is there then for an organization like CFI?

We promote critical thinking, which includes critical examination of religious beliefs and critical examination of pseudoscientific or fringe-science claims.

Well, to begin, I'm not as sanguine as others may be about the decline of organized religion. First, even in the developed world, especially in the United States, religion remains a very strong force that continues to have far too much influence on our public policy and in our educational system. Furthermore, as the current troubles in the Middle East and Africa remind us, fundamentalist religion is still very attractive to hundreds of millions of people. CFI's work is not confined to the United States or even to North America. We work on global issues, and one of the issues we have focused on in recent years is the repression of free speech and freedom of conscience in many countries, especially through the use of blasphemy laws. This continues to be a pressing problem; some may say it has even gotten worse.

But there's a more basic reason why the decline in religious belief, if it does continue, does not signify the end of CFI's work. *CFI's mission is not primarily to increase the number of atheists.* We are not an atheist missionary organization. I'm not saying that, all things considered, the decline in religious belief is not a good thing. It is a welcome development that people are becoming less committed to religious beliefs, especially fundamentalist religious beliefs. But CFI doesn't exist primarily to promote disbelief in God. We work at a deeper level. We promote critical thinking, which includes critical examination of religious beliefs and critical examination of pseudoscientific or fringe-science claims. Contrary to what some may assert, including some atheists, rejecting belief in God does not always mean one is a critical thinker.

If you will indulge me for a moment, permit me to reminisce about an exchange I had with another atheist shortly after I had given up my belief in God. I was a young man then—so it was a *very* long time ago—and the only secular organization with which I was acquainted happened to be American Atheists, then under the leadership of Madalyn Murray O'Hair. In any event, around the fall of 1981, Jerry Falwell, the notorious founder of the Moral Majority, made some disparaging remarks about atheists and gays, and some of us went to Lynchburg to protest. After the protest, we socialized and talked a bit about various topics. One gentleman was telling me how atheists, because they see through the falsehoods of religion, are also more inclined than most people to detect other false claims. I nodded in agreement. This person then went on to assert that the United States government was conspiring with Big Pharma to prevent cancer patients from receiving appropriate and inexpensive treatment. I said, "Really? What evidence do you have?" His answer: "Laetrile."

Yes, unfortunately, being a skeptic about religion does not necessarily imply a firm commitment to evidence-based reasoning. I see confir-

mation of this even today, in my position as president of CFI. As you know, CFI lobbies not just with respect to church-state issues but with respect to public policies that should be informed by sound science. Whenever we issue an alert or announcement about issues such as regulation of alternative medicine or climate change, I receive a few emails from some of our atheist supporters claiming I don't understand how alternative medicine works or I don't recognize that claims about climate change are part of a gigantic hoax. And please don't ask me about the 9/11 conspiracy theorists!

Yes, fostering critical thinking is more fundamental than religious skepticism and, as I said, CFI promotes critical thinking across the board. Critical examination of religion and of pseudoscience both constitute important parts of our work, because both are required if we are to fulfill our mission. Critical thinking is not just "negative" of course; we are not simply a community of debunkers. When we promote critical thinking we are at the same time promoting the scientific method and evidence-based reasoning. Our mission is not limited to achieving a secular society, but as I hope everyone knows, a secular society founded on science, reason, freedom of inquiry, and humanist values. *All* of those elements are important. You can have a secular society without these elements, but I don't think you'd want to live in it.

Moreover, the importance of critical thinking is not only validated by its relevance today; it is also validated by a review of history. Critical thinking is the acid that dissolves dogma, and human progress in the last two centuries has resulted in large part through the rejection of dogmatic thinking, whether promoted by the church, tradition, or pseudoscience. In particular, enlargement of our personal freedom has come about largely through rejection of dogmatic thinking. This may seem like a bold claim, but I think history bears me out.

With the Enlightenment there arrived a critical attitude to religious dogma and, in particular, the notion that the church in combination with the state could dictate what individuals should believe. Accordingly, we obtained a measure of religious freedom—the ability to decide for oneself what to believe about the gods (if anything). After the domination of the church and the supporting connections between the church and absolute monarchies were broken, we then acquired political freedom—the right to choose what laws to impose on ourselves. Next came an enlargement of civic and social freedom by, among other things, the elimination of slavery, the emancipation of women, and the removal of formal barriers to upward mobility generally, all of which would have been unthinkable in the rigid social structures that prevailed in the cultures of the past—social structures that were justified by religious tradition, and in cases of racial and sexual oppression, also by pseudoscience. Then, in the last fifty to seventy-five years, we have seen autonomy expanded in the sphere of our personal relations, such as marriage and divorce and reproductive options—again with all these advances being made possible because we live in a society that has increasingly rejected religious or ideological dogma. If someone claims marriage "must be" only between a man and a woman, we don't simply accept this assertion, we ask "why?" and then we look at the relevant evidence, in this case, for example, evidence about the stability of same-sex relationships and the record of same-sex couples as parents.

So critical thinking, the unwillingness to blindly bend to tradition and accepted ways of thinking, has been responsible for much of human progress.

But though much has been accomplished, much remains to be accomplished—which is why we need organizations like CFI to continue to fight for progress. As long as religious dogma is invoked in the halls of Congress—or in any legislature—as a basis for public policy, there will be a need for CFI; as long as religious institutions are given privileged status and are regarded as a source of moral authority, there will be a need for CFI; as long as scientific findings are misunderstood, manipulated, or suppressed and politicians, the media, and the general public accept magical, pseudoscientific thinking, there will be a need for CFI; as long as there is any country in the world where someone risks punishment for expressing her or his views about religion, there will be a need for CFI. *And CFI will be there*. Not only is our work not over, but we face many daunting challenges.

As we confront the daunting challenges that face us, however, we have one factor that works in our favor. Because we know there are no deities—or magic crystals—to provide for us or to guarantee us success, we also know that every action we undertake has great significance. We have to rely on ourselves and each other to get the work done. Some claim that a godless world is bleak and empty because it is deprived of "meaning." I vigorously disagree. In fact, as one learns to distance oneself from the supernatural, one begins to realize that it is precisely because our lives are finite and that we are ultimately responsible for what we accomplish or fail to accomplish, that our lives assume significance. What we do matters because we do not get second chances.

We have both the burdens and the satisfaction that comes with this self-knowledge. We understand the obstacles we face. But we also realize that if we work together, we can overcome these obstacles.

So there is a need for an organization like CFI—an organization that can bring us together and unify our efforts, that can give direction to our work.

It's been my privilege to lead CFI for seven years now. In a few months I will be stepping down, but our work will continue. CFI will continue to work toward a secular society founded upon science, reason, freedom of inquiry, and humanist values, not only in the United States but throughout the world. I submit to you that there is no more meaningful task than this. ■

Ronald A. Lindsay is the president and chief executive officer of the Center for Inquiry (which includes the Committee for Skeptical Inquiry). He is also a senior research fellow. A philosopher and bioethicist, his latest book is *The Necessity of Secularism*. This article is based on his talk concluding CFI's "Reason for Change" conference in Amherst, New York, on June 14, 2015.

‘Post-Materialist’ Science? A Smokescreen for Woo

A group of influential pseudoscientists have recently written a “manifesto” declaring the end of conventional science. Are they “mavericks,” on a par with Einstein, as some prominent advocates claim?

SADRI HASSANI

Pseudoscience has been rapidly gaining ground in the past few decades. Dietary supplements and homeopathic preparations, advertised by the disgraced Dr. Oz and his ilk, now constitute a multi-billion-dollar industry. Major universities house centers of integrative health, which offer courses in acupuncture, Reiki, Therapeutic Touch, qigong, and Vedic medicine, and are funded generously by the National Institutes of Health (NIH) (Mielczarek and Engler 2013). Elsevier, a reputable scientific publisher, is publishing journals devoted to pseudoscience (Beauregard et al. 2014). Pop culture icons such as Vani Hari (“the Food Babe”) have gathered armies of uninformed citizens, ready to sign petitions in hundreds of thousands to force their anti-scientific demands on the food industry (Godoy 2014; Alsip 2015).

The destructive strength of such misinformation stems from professionals in whom the public places its trust: medical doctors and scientists, some with impressive credentials. It is therefore imperative to lay bare the message of these professionals and show that, despite their credentials, their message contradicts the very science they once practiced.

Mavericks or Quacks?

David Pruett, a regular contributor to the *Huffington Post*, has posted a laudatory tribute to the “Manifesto for a Post-Materialist Science” (Pruett 2014), a document purporting a new paradigm of science in which the study of spirituality, parapsychology, and near-death experiences are elevated to the rank of quantum mechanics (QM). The document is signed by four psychologists, one social anthropologist, one medical doctor, one neuroscientist, and one biologist, none belonging to the mainstream of their disciplines (Beauregard et al. 2014). They include names that will be familiar to long-time SI readers for their advocacy of fringe-science, including psychologist Gary Schwartz, Marilyn Schlitz of the Institute of Noetic Sciences, mind-body medicine proponent Dr. Larry Dossey, and Rupert Sheldrake.

Schwartz is one of the three preparers of the manifesto. He is a psychologist at the University of Arizona (UA), who in 2002 received a $1.8 million award from the National Center for Complementary and Alternative Medicine of the NIH to create the Center for Frontier Medicine in Biofield Science (CFMBS) at UA. As the findings at the center were “too controversial for mainstream journals,” Schwartz compiled them in a trade book in 2007, the same year that CFMBS was closed down (Schwartz 2015)! Now Schwartz is the director of the Laboratory for Advances in Consciousness and Health (LACH, online at http://lach.web.arizona.edu/center_frontier_medicine_biofield_science_cfmbs), an alleged research lab in which mind-body and alternative medicines are investigated. LACH boasts its publications on its website. Clicking on the publications tab brings a page showing Schwartz’s *trade* books such as *The G.O.D. Experiments*. Curiously, under Published Articles (as of the writing of this article), there is only a promise: “List added soon …”! The websites of the other two preparers and the five remaining signers of the manifesto show similar out-of-the-mainstream accomplishments.

After extolling their credentials, Pruett writes: “The authors of the manifesto are all scientific mavericks whose viewpoints are not mainstream. . . . It’s worth noting, however, that neither were Copernicus, Galileo, Kepler, or Einstein mainstream.” This is a typical degradation of “mainstream” deployed by pseudoscientists to promote woo. Those who follow mainstream science, they say, cannot produce any revolutionary ideas. Pseudoscientists argue that the real geniuses, the ones that

change the course of our understanding of nature, are outside the mainstream. In fact nothing can be further from the truth.

There are three categories of scientists (MDs included):

1. Those who do mainstream science.
2. Those mainstreamers who bend the mainstream.
3. Those who leave the mainstream and turn into crackpots.

The overwhelming majority of scientists belong to the first category. Scientists including Galileo, Newton, Dalton, Crick and Watson, Planck, and Einstein belong to the second category. People in the third category may once have been accomplished scientists in the first category; however, for various reasons, they left the mainstream science, and with it, science itself. People like Deepak Chopra, Andrew Weil, Dr. Oz, Rupert Sheldrake, Fritjof Capra, and the authors of the "manifesto," by their own admission, are no longer mainstream scientists. And certainly they don't belong to the second category!

Since Pruett's main argument for the extolment of the post-materialist "science" is his characterization of the authors of the manifesto as "mavericks" on par with Copernicus, Kepler, Galileo, and Einstein, it is crucial to debunk this characterization and to demonstrate that these four scientists, as well as all other giants of science, were in fact mainstreamers.

There is a huge difference between introducing revolutionary ideas within the confines of the mainstream science and irresponsibly throwing in nonsense and calling it "revolutionary" simply because the mainstream scientists don't accept it. The mainstreamers' opposition to both types of ideas is a healthy reaction to the subversion of cherished and experimentally tested prevailing theories. The same mainstreamers who oppose a new idea eventually become its supporters once evidence verifies its validity. *That is how the mainstream bends!* On the contrary, a pseudoscientist's ad hoc gibberish gets thrown out of the mainstream—along with its proposer, if the latter insists on the unproven, untested, and unsubstantiated idea.

Mavericks of the Mainstream

Heliocentrism was discovered by the Greek astronomer and mathematician Aristarchus of Samos, who calculated the sizes of the Moon and Sun and their distances from Earth using data from the observation of the eclipses and phases of the Moon. By carefully examining the arc of the Earth's shadow on the Moon in a lunar eclipse, Aristarchus determined that the Moon's diameter is about one-third of the Earth's; from the observed angular size of a full moon, he found that the Earth-Moon distance was about thirty times Earth's diameter.

Aristarchus's (grossly underestimated) solar measurements showed that the Earth-Sun distance was about twenty times the Earth-Moon distance. And since both have approximately the same angular size in the sky, the Sun, being twenty times farther, must be twenty times bigger than the moon, or about seven times bigger than the Earth. Aristarchus concluded that the Earth, being smaller, must be going around the Sun! This conclusion was based entirely on the observations done by mainstream astronomers (Hassani 2010, 8).

Whether Copernicus knew of Aristarchus's calculations is a matter of controversy (Evans 2014). What is *not* controversial is that the data on the lunar eclipse and Earth-Moon distance were available to Copernicus in the mainstream astronomical books of his time, most notably Ptolemy's *Almagest*. And he used those data to invent his heliocentric model.

Like all other scientific activities, Western observational astronomy lay dormant after the Greeks until Danish astronomer Tycho Brahe made observations with unprecedented accuracy. He continued in the tradition of the Greek astronomers Hipparchus and Ptolemy and was essentially *the* mainstream, as he was one of the very few who observed the stars.

Brahe's precise observations of the planets showed disagreement with the two prevailing theoretical models: neither Ptolemy's geocentric model nor Copernicus's heliocentric model agreed with his data. As in all good science—and contrary to pseudoscience, which is based dogmatically on beliefs—if a theory does not agree with accurate observations, it needs to be modified.

As in all good science—and contrary to pseudoscience, which is based dogmatically on beliefs—if a theory does not agree with accurate observations, it needs to be modified.

Brahe, not well-versed in mathematics, was not in a position to make the modification. So he invited Johannes Kepler, a well-known mainstream mathematician and physicist at the time, to his observatory in Prague to analyze the data he had collected.

The decision of which theory to choose for modification was clear to Kepler. Ptolemy's geocentric model had already gone through myriad fine tunings over many centuries. Copernicus's heliocentric model, on the other hand, was much simpler: the Sun is at the center and all planets move around it in *circular* orbits. It took Kepler almost twenty years to revise the heliocentric model to make it agree with Brahe's data. Kepler replaced the circular orbits with *elliptical* ones. His work was an improvement on an existing theoretical framework to accommodate Brahe's mainstream observations (Hassani 2010, 40).

Galileo's greatest contribution to science was his emphasis on—and results obtained from—experiments. But he was by no means outside the

mainstream as Pruett claims. There *was* no mainstream science in Galileo's time, because there was no stream! The stream of Greek science began to dry up when a Roman soldier murdered one of the greatest scientists of all time, Archimedes.

Archimedes was well known not only as a great mathematician but also as an equally great inventor. While all of his finished works were of a theoretical nature, his investigations in mechanics and liquids deeply influenced his mathematical thinking (Heath 2002). Archimedes's use of "mechanical" methods to arrive at some of his key theoretical discoveries comes very close to the modern scientific process of designing theories based on observational measurements.

Sixteenth-century Europe saw the revival of science after a 1,800-year hiatus. There emerged two schools of thought. One school followed Plato and Aristotle and advocated the primacy of the mind. The other emphasized the importance of observation, and in this respect followed Archimedes, whose works had been translated into Latin and made available to the scientists of post-Renaissance Europe, including Francis Bacon, who promoted empiricism; Galileo Galilei, who applied the method to motion; and William Gilbert, who applied it to electricity and magnetism. Bacon, Galileo, Gilbert, and others restarted Archimedes's mainstream.

There is arguably no idea more revolutionary in science than the notion of quantum. The last decade of the nineteenth century saw an upheaval in mainstream physics as physicists tried to understand how a heated object produced electromagnetic (EM) radiation. Such an object was idealized to a black-body radiator (BBR). A brief history of Max Planck's discovery of quanta from a careful analysis of a black-body radiator helps to see the mainstream character of the discovery.

The study of BBR started with Gustav Kirchhoff—the same Kirchhoff whose laws of electric circuitry are taught in introductory (mainstream) physics courses; it was continued by Joseph Stefan and Ludwig Boltzmann, who discovered an equation for the brightness of a BBR; and it was further advanced by Wilhelm Wien, who came up with a formula describing detailed behavior of a BBR. Planck discovered a new derivation of Wien's formula and published his result in the mainstream journal *Annalen der Physik* in November 1899. In the same month, two experimentalists reported discrepancies between the formula and their observations to the meeting of the German Physical Society (GPS) in Berlin. When Wien scrutinized his formula, he concluded that it was valid only for short wavelengths.

In the meantime, one of Planck's experimental colleagues reported to him a recent observational finding concerning the long-wavelength behavior of BBR and its agreement with a formula derived by the British physicist Lord Rayleigh. Upon receiving this news, Planck, whose re-derivation of Wien's formula gave him advantage over other theorists, succeeded in finding a new equation that agreed with both ends of the BBR spectrum, and presented his result under the modest title *An Improvement of Wien's Spectral Law* to the GPS in October 1900 (ter Haar 1967, 79). For Planck, the urgent question now was why the new equation worked.

Planck had used purely thermodynamic reasoning to reach the new formula. However, there was another mechanistic and *materialistic* school of thought, which used statistical techniques in thermodynamics. Planck did not belong to this group, and, in fact, was opposed to such a line of thinking. However, after the success of his new formula, he started to lean more and more toward statistical mechanics. In his Nobel lecture, Planck recalled this proselytism and how it led to the principle of the quantization of electromagnetic radiation (Planck 1920).

Einstein came to prominence in 1905 for publishing three articles in the same journal that Planck had published his, *Annalen der Physik* (Einstein 1905a, 1905b, 1905c).

- The first article on the photoelectric effect was based on Planck's idea of the quantization of EM waves. This is the article for which Einstein won the Nobel Prize in Physics in 1921.
- The second article on the Brownian motion involved the atomic theory of matter and statistical mechanics, which by now had become a mainstream subject.
- The third article was on electrodynamics, which was one of the mainstream areas of study after Maxwell's prediction of the electromagnetic waves in 1865 and their subsequent discovery and production in 1887.

One area of research, in which many experimental and theoretical physicists were engaged, focused on the behavior of electromagnetic waves in moving media. In order to explain this phenomenon, Einstein invented the special theory of relativity.

Pruett is therefore utterly wrong in saying that Copernicus, Galileo, Kepler, and Einstein were not mainstream scientists!

Without going into as much detail, I list the mainstream contributions of the five principal founders of quantum mechanics because of their importance in the "manifesto":

- Bohr Model of the Hydrogen Atom: Neils Bohr published his quantum theory of the hydrogen atom in three papers in the mainstream journal *Philosophical Magazine*, which had earlier published groundbreaking articles by J.J. Thomson and Ernest Rutherfor (Bohr 1913a, 1913b, 1913c).
- Wave-Particle Duality: In 1923, Louis de Broglie presented three communications to the mainstream scientific organization Paris Academy, where he outlined the basics of a wave theory of matter. These communications became his PhD thesis in 1924 and an article in a mainstream journal in 1925 (de Broglie 1925).
- Uncertainty Principle: Werner Heisenberg, working on the mechanics of the hydrogen atom, came up with this principle and published it in the mainstream journal *Zeitschrift für Physik* (Heisenberg 1925). Heisenberg was noted for inviting other physicists to join his research. Among the physicists who collaborated with

Heisenberg were Felix Bloch, Rudolf Peierls, I.I. Rabi, Edward Teller, and Victor Weisskopf, all prominent mainstream physicists.

- Schrödinger Equation: Schrödinger published his equation in 1926 in *Annalen der Physik*, the same journal in which Einstein and Plank published their papers (Schrödinger 1926). His equation described the mechanics of the hydrogen atom and the quantization of its energy levels.
- Relativistic Quantum Mechanics: In 1928, P.A.M. Dirac published his paper that unified the special theory of relativity and quantum mechanics and predicted antimatter in yet another mainstream journal (Dirac 1928).

It is important to keep in mind the role of the hydrogen atom in the development of QM.

Quantum Mechanics: A Materialistic Theory

Quantum mechanics is a favorite subject of all varieties of pseudoscience. It is portrayed with a halo of mysticism that bears the signatures of Qi, Taoism, Ayurveda, Karma, and many of the other Eastern mystical concepts that the promoters of woo can concoct.

Pruett, echoing the manifesto, says, "Quantum mechanics, however, supersedes Newtonian mechanics and undermines the classical assumption of materialism." This is a complete distortion of truth! The fact that quantum theory was developed around the behavior of the hydrogen atom is a testimony to its *materialistic* nature and a falsification of the claim of post-materialist scientists that "QM has questioned the material foundations of the world by showing that atoms and subatomic particles are not really *solid objects*" [my emphasis] (Beauregard et al. 2014). What does this statement even mean? That only solid objects are material? That as soon as ice melts its materiality evaporates? Solidity, liquidity, and gaseousness—the three temperature-dependent states of matter—are all bulk properties of a large aggregate of atoms or molecules, themselves having none of the properties of the bulk material. The statement is similar to saying that human cells are not human because they cannot laugh and cry.

The deeper question of "what exactly *is* a (material) particle" was answered in Eugene Wigner's Nobel Prize–winning paper of 1939, published in yet another mainstream journal (Wigner 1939). Wigner proved mathematically that anything with energy and momentum, whether a subatomic particle or a truck, can be described by two numbers: its mass and its spin, either of which *could* be zero. Therefore, with mathematical precision, we can conclude that all particles—including atoms, subatomic particles, *and* (massless) photons—are material, and any science that studies them is, by its very nature, materialistic.

The quantum mechanics that "undermines the classical assumption of materialism" is fabricated by fringe and paranormal "scientists" who have been thrown out of the mainstream and find satisfaction in writing a "manifesto" to attract "comrades!" ■

References

Alsip, M.A. 2015. The 'Food Babe': A taste of her own medicine. Skeptical Inquirer 39(3)(May/June): 39–41.

Beauregard, M., G.E. Schwartz, L. Miller, et al. 2014. Manifesto for a post-materialist science. *Explore* 10(5): 272–274.

Bohr, N. 1913a. On the Constitution of Atoms and Molecules (Part I). *Philosophical Magazine* 26(151): 1-24.

———. 1913b. On the Constitution of Atoms and Molecules (Part II). *Philosophical Magazine* 26(153): 476-502.

——— 1913c. On the Constitution of Atoms and Molecules (Part III). *Philosophical Magazine* 26(155): 857-875.

de Broglie, L. 1925. Research on the theory of quanta. *Annales de Physique* 10(3): 22–128.

Dirac, P.A.M. 1928. The quantum theory of the electron. *Proceedings of the Royal Society of London. Series A* 117 (778): 610–24.

Einstein, A. 1905a. On a heuristic viewpoint concerning the production and transformation of light. *Annalen der Physik* 322(6): 132–148.

———. 1905b. On the motion of small particles suspended in a stationary liquid, as required by the molecular kinetic theory of heat. *Annalen der Physik* 322(8): 549–560.

———. 1905c. On the electrodynamics of moving bodies. *Annalen der Physik* 322(10): 891–921.

Evans, J. 2014. Aristarchus of Samos. December 10. Online at http://www.britannica.com/EBchecked/topic/34377/Aristarchus-of-Samos.

Godoy, M. 2014. Is the Food Babe a fearmonger? Scientists are speaking out. December 4. Online at http://www.npr.org/blogs/thesalt/2014/12/04/364745790/food-babe-or-fear-babe-as-activist-s-profile-grows-so-do-her-critics.

Hassani, S. 2010. *From Atoms to Galaxies*. Boca Raton: CRC Press.

Heath, T. 2002. *The Works of Archimedes*. New York: Dover.

Heisenberg, W. 1925. Quantum-theoretical re-interpretation of kinematic and mechanical relations. *Zeitschrift für Physik* 33: 879–893.

Mielczarek, E.V., and B.D. Engler. 2013. Nurturing non-science. Skeptical Inquirer 37(3)(May/June): 32–39. See also http://www.imconsortium.org/members/members.cfm.

Planck, M. 1920. Nobel lecture. June 2. Online at http://www.nobelprize.org/nobel_prizes/physics/laureates/1918/planck-lecture.html.

Pruett, D. 2014. Toward a post-materialist science (blog entry). *Huffington Post Religion Blog* (December 1). Online at http://www.huffingtonpost.com/dave-pruett/toward-a-postmaterialistic-science_b_5842730.html.

Schrödinger, E. 1926. Quantization as an eigenvalue problem. *Annalen der Physik* 384(4): 273–376.

Schwartz, G. 2015. Biography. Online at http://www.drgaryschwartz.com/Biography.html.

ter Haar, D., ed. 1967. *The Old Quantum Theory*. London: Pergamon Press.

Wigner, E. 1939. On unitary representations of the inhomogeneous Lorentz group. *Annals of Mathematics* 40(1): 149–204.

Sadri Hassani is professor emeritus of physics at Illinois State University. He is the author of several books at graduate, undergraduate, and introductory levels. His blog at skepticaleducator.org is devoted to exposing pseudoscientific misconceptions and distortions of science.

From Our Archives

These related Skeptical Inquirer articles are on our website, csicop.org:

"Gary Schwartz's Energy Healing Experiments: The Emperor's New Clothes?" by Harriet Hall, March/April 2008.

"How *Not* to Test Mediums: Critiquing the Afterlife Experiments" by Ray Hyman, January/February 2003.

"A Critique of Schwartz et al.'s After-Death Communication Studies" by Richard Wiseman and Ciaran O'Keefe, November/December 2001.

"Quantum Weirdness: An Analogy from the Time of Newton" by Paul Quincey, November/December 2008.

The 1848 'Enormous Serpent' of the DAEDALUS IDENTIFIED

A famous sea serpent sighting has been an enduring mystery of the sea since 1848. However, new information suggests a solution.

GARY J. GALBREATH

The sea serpent was once little more than a monster of Norwegian folklore. During the nineteenth century, various supposed sightings of the creature—mainly in the Atlantic—lent it some public and scientific credibility as a real animal (Heuvelmans 1968). A particularly influential sighting occurred from the British naval vessel *Daedalus* in 1848. There is no doubt that something remarkable passed by that ship on an August afternoon, and the *Daedalus* case has remained one of the most famous and puzzling maritime mysteries.

We have the advantage today of greater knowledge of large marine vertebrates than was available at the time, and we have two important contemporary drawings by a *Daedalus* witness that were not published until 1997. The *Daedalus* animal can finally be identified.

The Monster Mystery

On August 6, 1848, at about 5 PM, the frigate H.M.S. *Daedalus* encountered what its captain, P. M'Quhae, later described in a published official report (M'Quhae 1848a) as an enormous serpent, at least sixty feet long. This occurred in the South Atlantic, some 300 miles from the coast of present day Namibia. Three professional drawings of the animal (*The Illustrated London News* 1848; reproduced in Figures 1 and 2 here), authorized by Captain M'Quhae, were published. An excerpt for the day of the encounter from the diary of Lt. E.A. Drummond (1848) was also published, and a correspondent claiming to be an officer of the *Daedalus* later gave a basically confirmatory account ('An Officer . . .' 1858). Finally—and unexpectedly—in 1997, M. Drummond provided drawings (Figure 3) of the creature from Lt. Drummond's diary, via a communication to *The Log of Mystic Seaport* (Dash 2010). These drawings provide important clues about the *Daedalus* animal.

So, exactly what did the witnesses describe? M'Quhae (1848a) wrote that:

> . . . in latitude 24° 44' S., and longitude 9° 22' E., the weather dark and cloudy, wind fresh from the N.W., with a long ocean swell from the S.W., the ship on the port tack heading N.E. by N., something very unusual was seen by Mr. Sartoris, midshipman, rapidly approaching the ship from before the beam. . . .
>
> On our attention being called to the object it was discovered to be an enormous serpent, with head and shoulders kept about four feet constantly above the surface of the sea, and as nearly as we could approximate by comparing it with the length of what our maintopsail yard would show in the water, there was at the very least 60 feet of the animal *à fleur d'eau*, no portion of which was, to our perception, used in propelling it through the water, either by vertical or horizontal undulation. It passed rapidly, but so close under our lee quarter that had it been a man of my acquaintance I should have easily recognized his features with the naked eye; and it did not, either in approaching the ship or after it had passed our wake, deviate in the slightest degree from its course to the S.W., which it held on at the pace of from 12 to 15 miles per hour, apparently on some determined purpose.

> The diameter of the serpent was about 15 or 16 inches behind the head, which was, without any doubt, that of a snake; and it was never, during the twenty minutes that it continued in sight of our glasses, once below the surface of the water: its colour a dark brown, with yellowish white about the throat. It had no fins, but something like the mane of a horse, or rather a bunch of seaweed, washed about its back.

Three professional drawings of the animal, authorized by Captain M'Quhae, were published.

M'Quhae (1848b) later added that the animal had a flat head.

It would have been difficult to write a report much more effective in public impact. The phraseology is rather concise, yet not without drama; "On our attention being called to the object it was discovered to be an enormous serpent" engenders the same sort of shivery feeling as does Arthur Conan Doyle's (1902) famous line "Mr. Holmes, they were the footprints of a gigantic hound!" And consider the convincing power of "had it been a man of my acquaintance I should have easily recognized his features with the naked eye."

Drummond (1848), for his part, wrote that:

> . . . we observed a most remarkable fish on our lee quarter, crossing the stern in a S.W. direction: the appearance of its head, which, with the back fin, was the only portion of the animal visible, was long, pointed, and flattened at the top, perhaps ten feet in length, the upper jaw projecting considerably; the fin was perhaps twenty feet in the rear of the head, and visible occasionally: the captain also asserted that he saw the tail, or another fin, about the same distance behind it: the upper part of the head and shoulders appeared of a dark brown colour, and beneath the under jaw a brownish white. It pursued a steady undeviating course, keeping its head horizontal with the surface of the water and in rather a raised position, disappearing occasionally beneath a wave for a very brief interval, and not apparently for purposes of respiration. It was going at the rate of perhaps from twelve to fourteen miles an hour and when nearest was perhaps one hundred yards distant: in fact it gave one quite the idea of a large snake or eel. No one in the ship has ever seen anything similar, so it is at least extraordinary. It was visible to the naked eye for five minutes, and with a glass for perhaps fifteen more. The weather was dark and squally at the time, with some sea running.

One Drummond drawing (Figure 3B) includes annotations of a length of seven feet for the visible anterior part of the animal, and of thirty feet for the distance between that portion

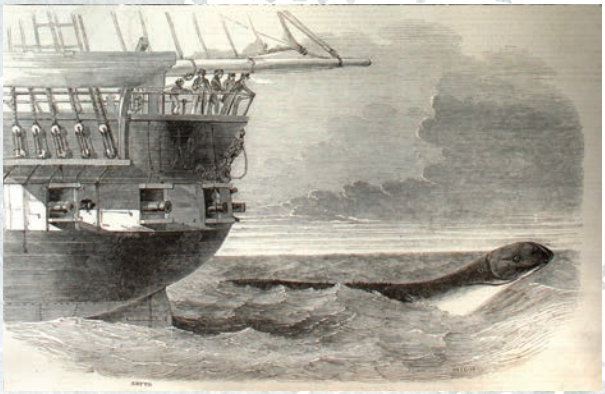


Figure 1: An iconic drawing of the *Daedalus* animal, as published in *The Illustrated London News*. This was produced by a professional artist with advice from Captain M'Quhae.

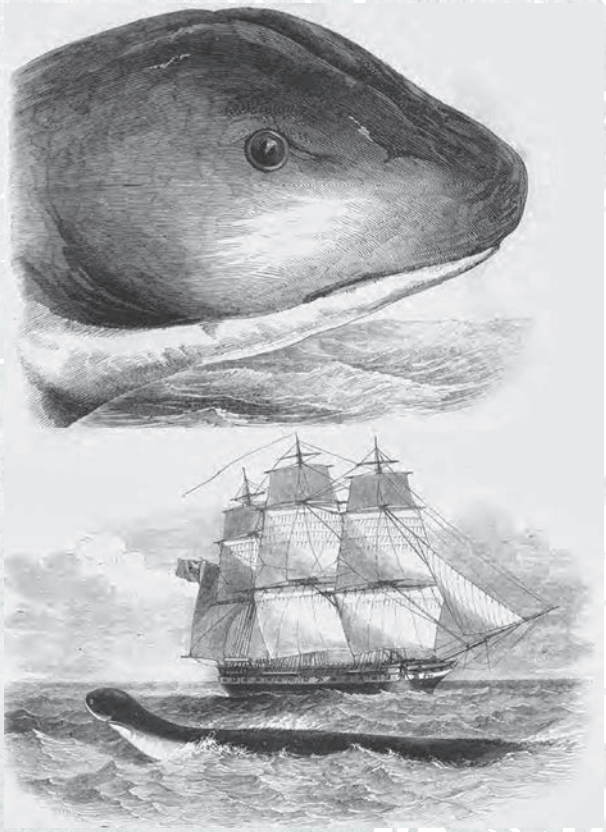


Figure 2: Two more drawings ("A" above and "B" below) by M'Quhae's artist, as published in *The Illustrated London News*. Note the ridges on the head.

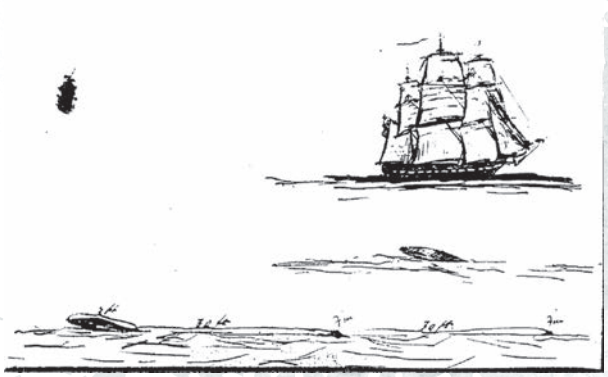


Figure 3: Drawings ("A" above and "B" below) of the *Daedalus* animal from the diary of Lt. Drummond, as published in *The Log of Mystic Seaport*. Note the long, flat head.

Figure 4: A sei whale in lateral view during surface skim feeding, from website Shetland Environment. Note similarity in profile to the *Daedalus* animal as depicted by Drummond. This photo was taken by George Graham and is his intellectual property.

Figure 5: The same sei whale viewed from behind, from website Shetland Environment. Note the ridges on the head. This photo was taken by George Graham and is his intellectual property.

Figure 6: The same sei whale in lateral view during skim feeding, from website Shetland Environment. Note the long, flat upper head. This photo was taken by George Graham and is his intellectual property.

and the top of the dorsal fin. Note that the "tail, or another fin" shown in the drawing is based on hearsay from M'Quhae.

The anonymous 'Officer' (1858) wrote that the animal was moving at probably not less than ten miles per hour, that water was surging under its chest, that it was not more than 200 yards away at its closest position, that it was in sight for about ten minutes, and that "the eye, the mouth, the nostril, the colour and form" were all distinctly visible. It should be noted that he was writing nearly a decade after the event, and may have been influenced by the writings and authorized drawings of his captain.

Monster Candidates

Suggestions as to the identity of the *Daedalus* entity have included an adult of a deep sea teleost fish (referenced to an unnamed source by Cogswell 1848), a land snake swimming at sea (Ibid.), a surviving plesiosaur ('F.G.S.' 1848), an undiscovered chondrichthyan fish (Mantell 1848), more specifically an undiscovered elongate shark (Melville 1848), an elephant seal (Owen 1848), a giant seaweed (*The Geelong Advertiser* 1849), an oarfish (Hawtaigne 1860), an undiscovered giant eel (Gosse 1864), an undiscovered greatly elongated whale (Gosse 1864), more specifically a surviving zeuglodont (Wood 1880), a giant squid (Lee 1883), an undiscovered long-necked seal (Oudemans 1892), an undiscovered giant salamander (Burr 1934), and an abandoned canoe being towed by a harpooned, submerged whale shark (de Camp and Crook de Camp 1968).

None of these authors had access to the revelatory Drummond drawings (Figure 3) that depict a quite long-snouted creature with a dorsal fin. Drummond's drawings nicely match his description of the animal's head as "long, pointed, and flattened at the top." As noted by Dash (2010), the data derived from Drummond's diary are of particular importance due to contemporaneity. In contrast, M'Quhae's report was written more than two months later, during which stretch of time memories can change. M'Quhae referred to a sketch made shortly after the sighting, but the iconic drawings in *The Illustrated London News* were not produced until October, and we do not know to what extent they resemble the original sketch, or how detailed that sketch was.

M'Quhae's account seems to imply that the animal came very close to the ship, as indeed is shown in one of the drawings he authorized (Figure 1). But another of those drawings (Figure 2B), and the accounts of both Drummond and the "Officer," are in agreement that the animal was much farther away at closest approach. (Drummond wrote that it was perhaps 100 yards away; the "Officer" wrote that it was not more than 200 yards away.) Moreover, there was poor light during the sighting; the weather was described as "dark and cloudy" by M'Quhae and as "dark and squally" by Drummond. Thus M'Quhae's comment on naked-eye observable detail was surely an exaggeration. Nonetheless, the witnesses had substantial time to view the animal and had telescopes to magnify the view.

Drummond did not perceive the expanse of body surface shown in M'Quhae's drawings (Figures 1 and 2B); rather, he saw the "head, which, with the back fin, was the only portion of the animal visible." M'Quhae wrote that the animal's head was never beneath the surface; this is contradicted by Drummond's statement that the head occasionally disappeared "beneath a wave." But their accounts agree that the animal was swimming along with its head fully out of the water much of the time. This behavior is not typical of large marine vertebrates swimming in the open ocean.

But suppose that what seemed to be the whole head was actually only partial, with the mouth open and the lower jaw underwater. Some baleen whales swim in this manner while skimming small organisms from the ocean surface; the whale's body and lower jaw are beneath the surface, while the upper jaw projects at an angle. In true skim feeding, at or below the surface, there is unidirectional water flow between the two baleen racks (located beneath the upper jaw) over much of their length, with filtration by baleen bristles, and with outward water flow between baleen plates. In the *Daedalus* case, the baleen, or part thereof, may have been mistaken for the lower jaw. Drummond mentioned, and illustrated (Figure 3A), that the apparent upper jaw was overshot, which can also be seen in M'Quhae's close-up view (Figure 2A). This aspect conforms nicely to the relationship between the tip of a whale upper jaw and the forward limit of the baleen beneath it (Figure 4).

Perhaps, then, the *Daedalus* creature was a rorqual baleen whale feeding at the surface. It is easy to understand how the flat, triangular rorqual upper head (Figures 4 to 6), with its more reptilian than mammalian general appearance, could have been mistaken for the head of a snake by M'Quhae. And his conviction that the animal was a snake may have influenced aspects of his artist's drawings (Figures 1 and 2). The snake-like eye depicted may have been based on some blemish or shadow effect seen on the whale's head; the real eye would have been located at the extreme lateral extension of the head, and often underwater. On the other hand, M'Quhae may have glimpsed the real eye, without accurate clarity as to its placement.

M'Quhae's close-up of the head (Figure 2A) depicts a ridge that seems to run parallel to the midline anteriorly and then splits posteriorly into two branches, producing a Y shape overall. This ridge (actually located right on the midline) is found in rorquals, the blowholes being located within the two angled posterior branches (Figure 5). No spouting was mentioned by the *Daedalus* witnesses. However, exhalation during surface skim feeding can produce merely a low cloud of droplets, potentially mistakable for spray from movement or from wave impact.

The rather different Drummond and M'Quhae depictions of the *Daedalus* animal can be reconciled reasonably under the rorqual hypothesis. In lateral profile in surface skimming stance (Figures 4 and 6), a rorqual upper head looks long, flat, and pointed, greatly resembling Drummond's contemporary drawings (Figure 3). But when seen from behind (Figure 5), as when the *Daedalus* animal was moving away from the ship, a rorqual upper head can look relatively short and blunt, and somewhat constricted at the back, a perspective that may have influenced the later M'Quhae depictions (Figures 1 and 2).

The rather different Drummond and M'Quhae depictions of the *Daedalus* animal can be reconciled reasonably under the rorqual hypothesis.

Can the type of rorqual seen from the *Daedalus* be identified? One species should be considered mainly due to the shape of its dorsal fin. M'Quhae mentioned a seaweed-like mane on the *Daedalus* animal (reminiscent, notably, of the sea serpent's mane in Norwegian folklore), and his artist depicted (Figures 1 and 2B) two low, narrow ridges of shaggy material, one being located at the posterior end of the visible part of the creature. Drummond referred to an occasionally visible "back fin" presumably corresponding to the more anterior ridge shown by M'Quhae's artist, and drew this (Figure 3B) as a low dorsal fin with a gently concave rear edge. The fin drawn by Drummond is most similar to the "stepped" dorsal fin of the humpback whale (*Megaptera novaeangliae*), a species that could easily have been present in early August at the *Daedalus* location.

There are, however, difficulties in attempting to identify the *Daedalus* animal as a humpback. The large sensory nodules adorning the head seem unlikely to have gone unnoticed (though one of them could have been mistaken for

an eye). The behavioral difficulty is greater. Humpbacks consuming fish have been observed slowly and briefly moving forward with the upper jaw above the surface and the mouth widely open (Stamation et al. 2007). But a humpback moving steadily for a lengthy period, in a position like that of the *Daedalus* animal, would seemingly have been engaging in maladaptive behavior. The baleen racks, with their relatively short plates, would have been largely out of the water, ruling out true surface skim feeding on tiny organisms. Perhaps a humpback was engaging in anomalous behavior that day in 1848, but the humpback is not the preferred candidate for the *Daedalus* creature.

Happily, there is a rorqual species of appropriate size and color that possesses an appropriately contoured head, that sometimes engages in steady surface skim feeding, and that could easily have been present at the sighting location in early August: the sei whale (*Balaenoptera borealis*). The sei (pronounced "say") whale has anatomical adaptations for opportunistically feeding in skimming mode (Brodie and Vikingsson 2009). The typical angle the upper head makes with the ocean surface during surface skim feeding (Figures 4 to 6) is that drawn by Drummond (Figure 3) for the *Daedalus* creature. The sei is a slender whale, usually between forty and fifty-five feet in length when fully grown, and dorsally mainly gray to dark brown in color. Most of the baleen plates are mainly dark (Figure 4), but many can be distally whitish, and all the bristles are whitish or white, which explains the reported color of the underside of the *Daedalus* creature's "under jaw." M'Quhae, at least, seems to have taken the darker proximal parts of the plates to have been part of the upper jaw.

A sei whale usually possesses a sickle-shaped dorsal fin, small but prominent. The dorsal fin (unlike the head) of the *Daedalus* animal was only occasionally visible, and viewing conditions were far from ideal; perhaps only the tip of the fin was dragging at the surface, making its shape difficult to ascertain. Alternately, the fin may have been in damaged or otherwise unusual condition. An interesting photograph (Engblom 2011) shows a possible sei whale with a low, flat dorsal fin. Many baleen whales bear damage of one sort or another from past orca attacks. If a more stereotypical cetacean dorsal fin had been noted, perhaps the *Daedalus* whale would never have been reported as a giant serpent.

A classic maritime mystery seems solved: The animal seen from the frigate *Daedalus* on that fateful winter day in 1848 was almost certainly a rorqual whale feeding at the surface with its mouth open. That would presumably constitute a puzzling sight for many mariners of either the nineteenth or the twenty-first century. ■

Acknowledgements

This research has involved a confluence of mystery investigation and science. It is therefore particularly appropriate to dedicate this paper to my mother, Ruthie E. Weber Galbreath, who loved mystery stories and their solutions, and to my father, Donald H. Galbreath, a fine engineer with scientific training. I thank the noted natural history writer Sy M. Montgomery for comments on the evolving manuscript. The wonderful sei whale photographs in Figures 4 to 6 were downloaded from Shetland Environment (shetlandenvironment.createaforum.com); they are the intellectual property of the photographer, George Graham.

References

'An Officer of Her Majesty's ship *Daedalus*.' 1858. *The Times* (February 16).

Brodie, P., and G. Vikingsson. 2009. On the feeding mechanisms of the sei whale (*Balaenoptera borealis*). *Journal of Northwest Atlantic Fishery Science* 42: 49–54.

Burr, Malcolm. 1934. Sea-serpents and monsters. *Nineteenth Century* 115(684): 220–230.

Cogswell, C. 1848. Pages 2316–2323 in "The Great Sea-Serpent" section, edited by E. Newman, *The Zoologist* 6: 2306–2324.

Dash, Mike. 2010. Our artist pictures what the witness saw . . . *Dry as Dust. A Fortean in the Archives*. A Charles Fort Institute Blog (May 24). Online at blogs.forteana.org/node/121.

de Camp, L. Sprague, and Catherine Crook de Camp. 1968. *The Day of the Dinosaur*. Modern Literary Editions Publishing Co., New York.

Doyle, Arthur C. 1902. *The Hound of the Baskervilles*. George Newnes, Ltd., London.

Drummond, Edgar. 1848. Pages 2306–2307 in "The Great Sea-Serpent" section, edited by E. Newman, *The Zoologist* 6: 2306–2324.

Engblom, Gunnar. 2011. Online at kolibriexpeditions.com/birdingperu/blog/whale-watching-in-peru.

'F.G.S.' 1848. Page 2311 in "The Great Sea-Serpent" section, edited by E. Newman, *The Zoologist* 6: 2306–2324.

Gosse, Philip H. 1864. *The Romance of Natural History*. Gould and Lincoln, Boston.

Hawtaigne (Captain). 1860. A sea serpent in the Bermudas. *The Zoologist* 18: 6934–6935.

Heuvelmans, Bernard. 1968. *In the Wake of the Sea-Serpents*. Hill and Wang, New York.

Lee, Henry. 1883. *Sea Monsters Unmasked*. William Clowes and Sons, Ltd., London.

Mantell, Gideon A. 1848. Page 2310 in "The Great Sea-Serpent" section, edited by E. Newman, *The Zoologist* 6: 2306–2324.

Melville, A.G. 1848. Page 2310 in "The Great Sea-Serpent" section, edited by E. Newman, *The Zoologist* 6: 2306–2324.

M'Quhae, Peter. 1848a. Pages 2307–2308 in "The Great Sea-Serpent" section, edited by E. Newman, *The Zoologist* 6: 2306–2324.

———. 1848b. Pages 2323–2324 in "The Great Sea-Serpent" section, edited by E. Newman, *The Zoologist* 6: 2306–2324.

Oudemans, A.C., Jr. 1892. *The Great Sea-Serpent*. E.J. Brill, Leiden, Netherlands.

Owen, Richard. 1848. The great sea-serpent. Pages 2312–2316 in "The Great Sea-Serpent" section, edited by E. Newman, *The Zoologist* 6: 2306–2324.

Stamation, Kasey A., David B. Croft, Peter D. Shaughnessy, et al. 2007. Observations of humpback whales (*Megaptera novaeangliae*) feeding during their southward migration along the coast of southeastern New South Wales, Australia: Identification of a possible supplemental feeding ground. *Aquatic Mammals* 33(2): 165–174.

The Geelong Advertiser. 1849. The great sea snake. In *The Geelong Advertiser* 9 (1015). Geelong, Victoria, Australia.

The Illustrated London News. 1848. The great sea-serpent—evidences of the former appearances of the sea-serpent—the great American sea-serpent. (October 28).

Wood, Searles V., Jr. 1880. Order Zeuglodontia. *Nature* (November 18).

Gary J. Galbreath, PhD, is associate director, biological sciences, Northwestern University, Evanston, Illinois, and research associate in paleomammalogy, Field Museum of Natural History, Chicago. He is an evolutionary biologist specializing in the study of tropical and subtropical placental mammals.

Encouraging Evidence-Free Enterprise: Business on a Bed of Sand

The former National Center for Complementary and Alternative Medicine's use of two U.S. government grant programs for small businesses is examined and found to lend legitimacy to the lucrative business of non-evidence-based medicine.

BRIAN D. ENGLER AND EUGENIE V. MIELCZAREK

Our previous analyses of awards to medical schools and alternative medicine schools by the former National Center for Complementary and Alternative Medicine (NCCAM)[1] and its parent National Institutes of Health (NIH) revealed that, from 1999 to 2013, more than $2 billion in taxpayer money was used to convince Americans that non-evidence-based protocols, such as acupuncture and chiropractic spine manipulation, are medical procedures. Our analyses also showed that violations of the laws of basic science, such as the claims that underlie homeopathy and distance healing, are considered acceptable interventions even within a hospital structure and fall under the Affordable Care Act (ACA).

Our previous analyses covered awards designed by NIH's NCCAM to install non-evidence-based medicine courses into respected academic schools such as Harvard, Michigan, and Yale, and to beef up schools of alternative medicine such as the College of Oriental Medicine and Bastyr. The fact that the staff at a center at NIH does not distinguish between fantasy and evidence is troubling at best and represents ignorance and misuse of scarce health resources at worst.

In addition to the nearly $3 billion spent on complementary and alternative medicine (CAM) research grants (Mielczarek and Engler 2012), and the nearly $76 million spent on CAM training and education (Mielczarek and Engler 2013), and the funding of schools of oriental medicine and naturopathy (Mielczarek and Engler 2014), another pair of federal programs has been active in the alternative medicine sphere. These two are the U.S. government's Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) grant programs. NIH is one of the five federal agencies that collectively account for nearly all SBIR funding (National Research Council 2009), and NCCAM, along with other NIH centers and institutes, actively participates in the program (see http://grants.nih.gov/grants/funding/sbir.htm).

The two business grant programs, SBIR and STTR, were created to encourage "domestic small businesses to engage in Federal Research/Research and Development (R/R&D) that has the potential for commercialization" and to expand "funding opportunities in the federal innovation research and development (R&D) arena," respectively. Each has similar goals, with the SBIR program focusing on meeting federal research and development (R&D) needs while fostering "innovation and entrepreneurship by socially and economically disadvantaged persons" whereas the STTR program focuses on fostering "technology transfer through cooperative R&D between small businesses and research institutions" and "private sector commercialization of innovations derived from federal R&D."

Grants are divided into phases, with Phase I "to establish the technical merit, feasibility, and commercial potential" of the effort usually limited both in duration and funding, and Phase II "to continue the R/R&D efforts initiated in Phase I" allowing more time and funds for promising work. For health-related funding, Phase III usually requires a clinical trial (further details on both programs, including the phases defined for each, can be found at http://www.sbir.gov/). In 2003, the SBIR/STTR programs reached a peak with over 7,400 grants totaling in excess of $1.8 billion. In 2013, the last year reported, the number of grants was nearly 5,100, but the total cost approached $2.0 billion (https://www.sbir.gov/sbirsearch/award/all). Applications exceeded grants universally

across all federal agencies authorized to make them. Success stories for both programs abound online, and both are popular.

The very nature of these programs means that individual grants tend to rely on cutting-edge technology. This isn't a bad thing as long as the technology is grounded in some evidence of efficacy. However, scientific substantiation seems to be in short supply in many of the projects we examined.

Using the publicly available NIH RePORTER tool (http://projectreporter.nih.gov/reporter.cfm), we found that over the past fourteen years, NIH has awarded 167 SBIR/STTR grants to seventy-eight organizations totaling over $40 million via NCCAM, largely for questionable (to put it charitably) endeavors. Our research reveals that small companies received awards focused on alternative medicine for a variety of reasons: to invent some rather remarkable devices, to search for medically useful botanicals, and to archive data and develop media presentations. Thus SBIR/STTR programs present an opportunity for the business community to take advantage of NCCAM's tendency to provide legitimacy to non-evidence-based medicine in nourishing a $33.9 billion annual business (Nahin et al. 2009) itself fed by current societal mythologies.

We reviewed all NCCAM-funded small business grants since 2000 and discovered that the majority tend to fall into three broad categories that as shorthand we term Devices, Botanicals, and Data. In this article, we address a few of what we consider to be the least justifiable grants to shine a light on yet another area in which the NIH's NCCAM is wasting taxpayer dollars.

Figure 1 displays only those organizations that have received $500,000 or more over the period of time for which data were available to the authors. Easily recognizable are fifteen companies that received funds of over $1 million. Focusing on these fifteen recipients of NCCAM's largest SBIR/STTR awards, we find all three broad categories represented: three recipients (Advanced Medical Electronics, Bahr, and Stromatec) are publicized on their own websites as medical device companies; eleven sell botanical supplements; and one (Sociometrics) is a social research institution. Much of the money shown in Figure 1 is dedicated to developing devices to monitor adherence to Tai Chi, measuring the incidence of hot flashes, quantifying acupuncture needling, and searching botanicals in an attempt to discover natural products that can be marketed as supplements. Because the data-focused grants were unremarkable and not CAM-specific, this paper will concentrate on the devices and botanicals categories.

Figure 1. NCCAM SBIR/STTR Totals to organizations near or over $500k (2000–2013)

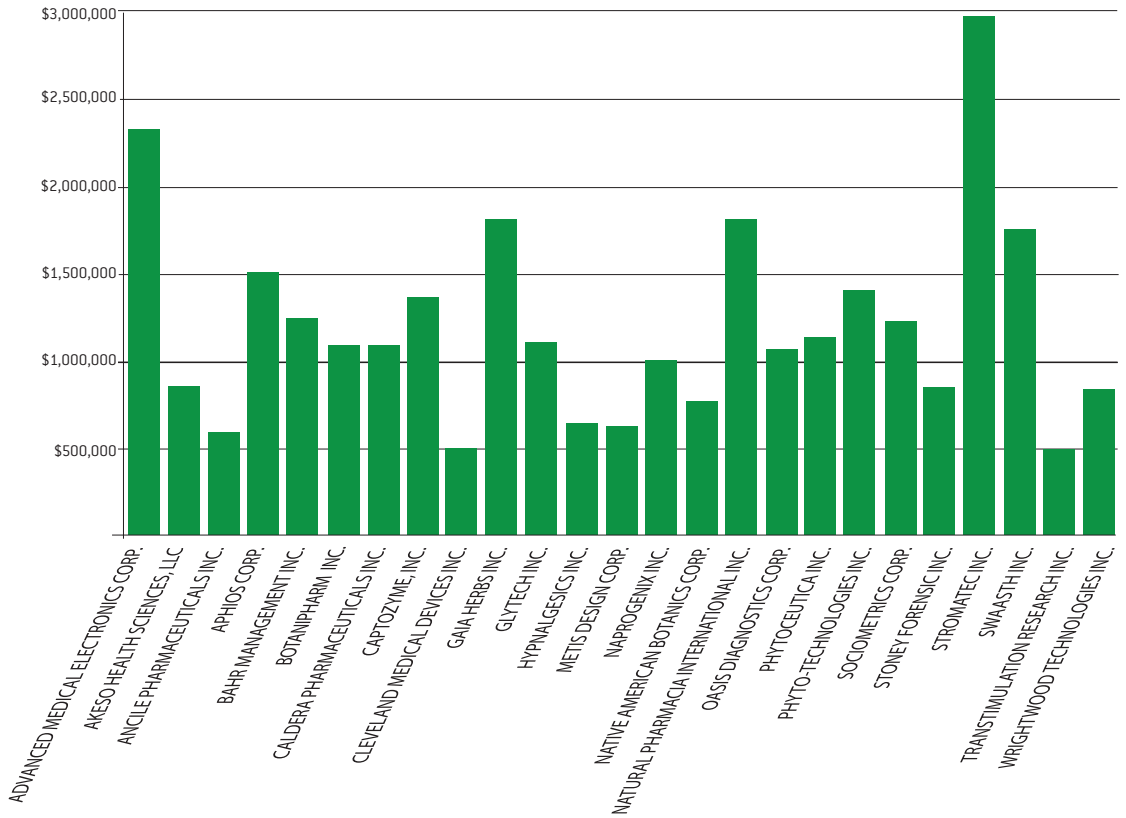


Figure 1. A graphic representation of individual organizations that received $500,000 or more in NCCAM SBIR/STTR grants between 2000 and 2013.

We used data from NIH RePORTER to track selected NCCAM SBIR/STTR grants to learn whether any had produced inventions or pharmaceutical discoveries.

Devices

Imagine you are a concerned scientist or physician hoping to affect American health. Your expertise and concerns have been noted, and you are asked to serve on a federal committee. The committee's function? Prioritizing funding of NCCAM'S SBIR/STTR grant proposals for devices. Match your concept of appropriate funding for proposed devices with those of NCCAM's SBIR awards.

1. Hot flash monitor devices measuring menopause symptoms:

   a) Over $3 million
   b) Between $2 and $3 million
   c) Less than $2 million

2. Wearable devices measuring adherence to mind-body protocols of Tai Chi and Yoga positions:

   a) Over $3 million
   b) Between $2 and $3 million
   c) Less than $2 million

3. Devices measuring acupuncture torque:

   a) Over $3 million
   b) Between $3 and $2million
   c) Less than $2 million

See Figure 2 for the answers.

Two "device" firms have received funds exceeding $2 million: Stromatec and Advanced Medical Electronics. Stromatec's website advertises its Acusensor 2 for teaching and quantifying acupuncture needling (see http://www.stromatec.com/acusensor2/). Presumably this invention was possible through the SBIR awards Stromatec has been given for three clinical trials testing its sensors. The test for its torque sensor was to have involved 169 persons. It's not clear whether the device tested in this clinical trial is its web-advertised Acusensor 2 or something similar. The trial is listed as completed, but no study results are posted. Some respected academic medical schools list acupuncture as an elective, offering a prospective sales market for Stromatec's Acusensor 2.

Figure 2. Examples of NCCAM-Funded Device SBIRs (Millions of Dollars)

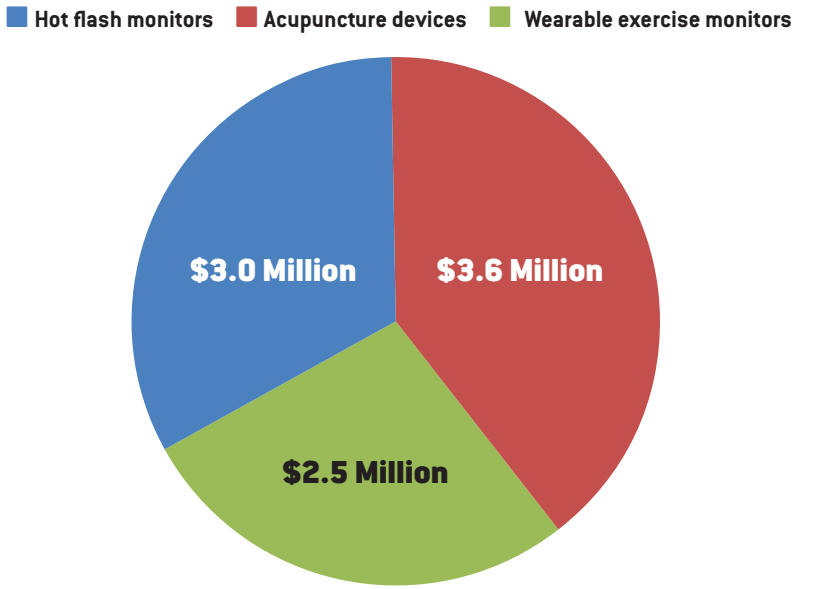


Figure 2. A graphic depiction of $9.1 million in NCCAM SBIR/STTR grants for three types of devices—specifically, those designed for hot flash monitoring, wearable exercise monitoring, and acupuncture needling.

Our search of NIH NCCAM records from 1999–2014 shows an expenditure of $188 million for 561 projects by NCCAM to study the efficacy of acupuncture.[2] Over this same time period, for all NIH centers, NIH REPORTER lists expenditures for acupuncture totaling $251 million (760 awards). NCCAM's active projects (as of this writing) related to the efficacy of acupuncture total thirty-one projects at $12 million. NIH's clinical center employs an acupuncturist (http://www.acupuncturesolution.com/index.html); however, studies that compare the success of trained acupuncturists with untrained ones finds no difference between claims of success by trained over the untrained (http://www.sciencebasedmedicine.org/nc/).

NIH has indulged in a tenacious pursuit of medical credence for a protocol based on the concept that mammals are threaded by undefined "energy meridians." Criticisms of NIH's studies of and endorsements for acupuncture, and of acupuncture itself, have been posted in numerous places online (e.g., http://edzardernst.com/2013/12/acupuncture-its-a-placebo-isnt-it/; http://theness.com/neurologicablog/index.php/another-acupuncture-fail/; http://www.sciencebasedmedicine.org/reference/acupuncture/) as well as in books (Novella et al. 2013; Offit 2013; Singh and Ernst 2009). Even so, NIH incorporates acupuncture as part of its online education, although when accessed July 15, 2014, its webpage was annotated as ". . . an historical document . . . that may be out of date" (https://nccam.nih.gov/training/videolectures/acupuncture.htm).

Studies that compare the success of trained acupuncturists with untrained ones finds no difference between claims of success by trained over the untrained.

NIH's continued examination and even endorsement of acupuncture in the face of all scientific evidence to the contrary is an inexplicable use of taxpayer funds for questionable medical research.

The mystique of a Tai Chi exercise program is reflected by 118 awards from NCCAM that total $38 million. The awards include Research and Training and SBIR grants totaling $400,000 (2012–2014) to develop a three-sensor inner sole attached to a wireless platform that is supposed to record adherence to Tai Chi exercises. The device is currently being tested in a clinical trial at Spaulding Memorial Hospital in Boston (https://clinicaltrials.gov/ct2/show/NCT01687023?term=tai+chi+AND+spaulding&rank=1).

Popular hopes for medically effective "alternative" protocols drive SBIR awards that include examining the misconception that physiologically generated electrical phenomena are a separate field of study unrelated to known physical science. These misconceptions of electromagnetism continue to fuel hopes of CAM practitioners and have generated millions of dollars of grants from NIH's NCCAM. It is surprising that in view of the National Academy of Sciences report (National Research Council 1997) and the FTC's Operation CURE.ALL that an SBIR review committee could ignore established science.

Figure 3. $8.8M in NCCAM-Funded SBIRs/STTRs for Botanicals (2008–2013)
(By Condition and Botanical Focus, awarded over $300K)

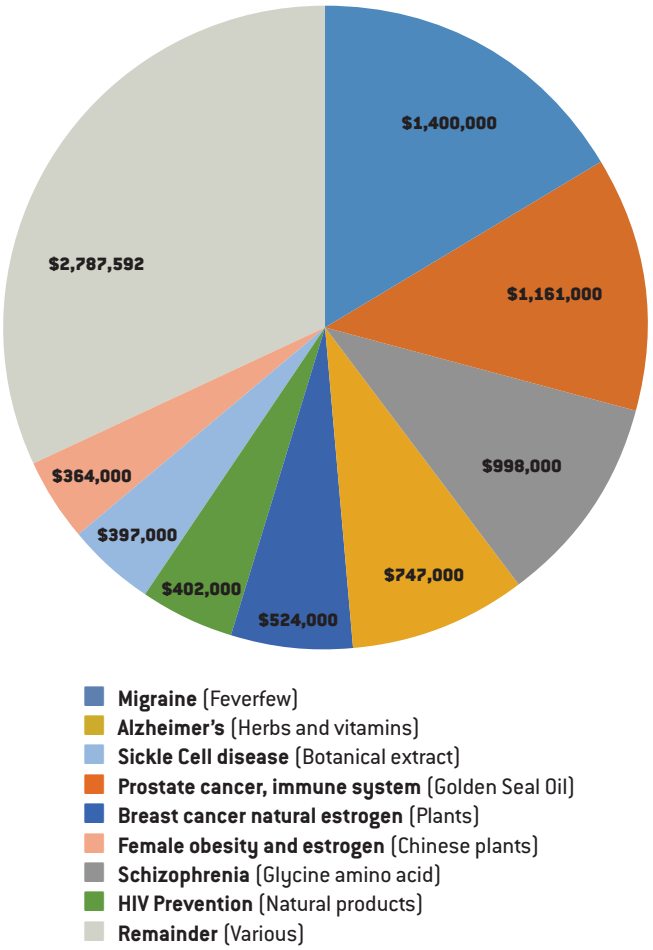


Figure 3. A graphic depiction of $8.8 million in NCCAM SBIR/STTR grants for botanicals, broken out by the condition for which the research was intended and its botanical focus, where these were discernable from the NCCAM project descriptions.

Botanicals

To be clear, we do not find fault in general with appropriate research into medical uses of botanicals. The problem we noticed during our SBIR/STTR research has been that many of these grants to small businesses to commercialize plant products for medical or health purposes seem to presuppose efficacy that either has not yet been proven or that has been disproven.

As shown in Figure 3, conditions considered for botanical focus include cancer, mental disorders, and even sickle cell disease, an inherited anemia. Products advertised by the businesses to combat these conditions include feverfew, goldenseal oil, red lettuce, black raspberries, green tea, saw palmetto, various Alaskan plants, and Chinese herbs.

One example of a botanical that was claimed to have medical potential is goldenseal oil (*Hydrastis canadensis*). SBIR/STTR awards total $1.4 million, the majority of which was awarded to a single source (http://www.prweb.com/releases/2012/6/prweb9652644.htm). Goldenseal, or more correctly some alkaloids in it, most notably berberine, is purported to combat inflammation and infection. Goldenseal also is one of the most popular dietary supplements in the United States. However, NCCAM's own website states: "Few studies have been published on goldenseal's safety and effectiveness, and there is little scientific evidence to support using it for any health problem" (https://nccih.nih.gov/health/goldenseal). NCCAM has spent more than $1 million in SBIR/STTR funds principally for "development of research-grade goldenseal" ostensibly "to facilitate clinical studies." NCCAM-funded research projects received a total of over $700,000 in 2013 and 2014 to "explore an alternative strategy for combating bacterial infections" employing goldenseal as a potential "treatment or preventative for bacterial infections such as methicillin-resistant–*Staphylococcus aureus* (MRSA)" (http://projectreporter.nih.gov/project_info_history.cfm?aid=8443080&icde=0). We have yet to see those studies bear fruit.

A general search of clinical trials for botanicals, irrespective of funding source, listed sixty-six trials, apparently none of which demonstrated any efficacy (https://clinicaltrials.gov/ct2/results?term=botanical). Of the sixty-six, only two report that they "Have Results." Of these two, one has published negative results (http://www.ncbi.nlm.nih.gov/pubmed/23553159?dopt=Abstract) and the other only a trial bulletin to date (http://trialbulletin.com/lib/entry/ct-00556504). Some of the more non-surprising results: Don't depend on a handful of herbs to eliminate a blood clot or red lettuce to control insulin levels. This is a discouraging indicator for commercial success.

Again, we do not claim that such research cannot be useful, but we do question, as we have in previous articles, why a separate "alternative" therapy-focused center, namely NCCAM, is needed when so many other disease- or infection-specific institutes and centers within NIH already can do the work. For example, the half billion dollars of NIH research related to MRSA very logically has been placed under the direction of the National Institute of Allergies and Infectious Diseases (NIAID). If goldenseal or extracts from it prove to be of value against MRSA, it will be considered medicine—not "complementary" medicine—so, once more, why does NIH need a separate center for CAM?

You are invited to test your socially informed perceptions against the results of the clinical trials by visiting the ClinicalTrials.gov home page (https://clinicaltrials.gov/ct2/home) and searching for your favorite brand of woo (http://rationalwiki.org/wiki/Woo). ■

Notes

1. Last December, NCCAM changed its name to the National Center for Complementary and Integrative Health, NCCIH (see "NCCAM's Name Change Fails to Impress," SI, May/June 2015). Since all our previous analyses and this new one were completed while the center went under its previous name, in this article we will continue to refer to "NCCAM." If you prefer, you may substitute "NCCIH."

2. The numbers cited regarding efficacy of acupuncture include all grants, including research and training, not solely SBIR/STTR.

References

Mielczarek, Eugenie V., and Brian D. Engler. 2012. Measuring mythology: Startling concepts in NCCAM grants. Skeptical Inquirer 36(1)(January/February): 35–43.

———. 2013. Nurturing non-science: Startling concepts in physician education. Skeptical Inquirer 37(3)(May/June): 32–39.

———. 2014. Selling pseudoscience: A rent in the fabric of American medicine. Skeptical Inquirer 38(3)(May/June): 42–51.

Nahin, Richard L., Patricia M. Barnes, Barbara J. Stussman, et al. 2009. *Costs of Complementary and Alternative Medicine (CAM) and Frequency of Visits to CAM Practitioners: United States, 2007: National Health Statistics Reports, Number 18*. Hyattsville, MD: National Center for Health Statistics. Online at http://nccam.nih.gov/news/camstats/costs.

National Research Council. 1997. *Possible Health Effects of Exposure to Residential Electric and Magnetic Fields*. Washington, D.C.: The National Academies Press.

———. 2009. *An Assessment of the Small Business Innovation Research Program at the National Institutes of Health*. Washington, D.C.: The National Academies Press.

Novella, Steven, David Gorski, and Mark Crislip, editors. 2013. *Science-Based Medicine: Guide to Acupuncture and "Eastern" Medicine*. Kindle Edition. James Randi Educational Foundation.

Offit, Paul A. 2013. *Do You Believe in Magic? The Sense and Nonsense of Alternative Medicine*. New York: Harper Collins.

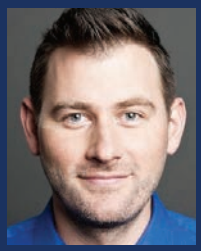
Singh, Simon, and Edzard Ernst. 2009. *Trick or Treatment: The Undeniable Facts about Alternative Medicine*. New York: W.W. Norton & Co.

Brian D. Engler is affiliate faculty at George Mason University. A retired U.S. Navy Commander, his fields of study are operations research and business administration.

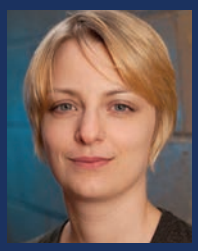
Eugenie V. Mielczarek is emeritus professor of physics at George Mason University. Her background is in materials research and biological physics.

POINT OF INQUIRY
WITH JOSH ZEPPS & LINDSAY BEYERSTEIN

For in-depth interviews with the most fascinating minds in science, religion, and politics, join *Point of Inquiry* cohosts Lindsay Beyerstein and Josh Zepps at pointofinquiry.org.



Josh Zepps (cohost) is a new media pioneer; a journalist serving as a founding host and producer at the online talk network HuffPost Live, following hosting stints with such outlets as Bloomberg TV, the Discovery Channel, and as an anchor for CBS's Peabody Award-winning *Channel One News*.



Lindsay Beyerstein (cohost) is an award-winning investigative journalist and staff writer for *In These Times*. Her work has appeared in places such as *The New Republic*, *Reuters*, *Slate*, *Salon*, *Ms. Magazine*, and *The New York Press*. Wait to see what stories she tells with her guests on *Point of Inquiry*.

Is Wikipedia a Conspiracy? Common Myths Explained

SUSAN GERBIC

This past June, the Guerrilla Skepticism on Wikipedia (GSoW) project celebrated its fourth anniversary. The project has been a great success. Wikipedia is the default source of information for hundreds of millions of people around the world. Over the years, I've heard many myths and misconceptions about editing Wikipedia.

At almost every Q&A, I hear the story of someone who attempted to edit Wikipedia and "they" deleted their edits. I've heard how people tried to edit the evolution page, the homeopathy page, and the astrology page, and every time they could not get the content to stick. Often I hear that they were suspended or banned from editing Wikipedia. Often they tell the story as if it is evidence of a conspiracy by the paranormal community to control content on Wikipedia.

I've heard many stories of how they wrote an amazing Wikipedia article for a subject and then it was deleted for no good reason or was marked as not being noteworthy and "they" didn't even bother to look for sources. I'm told "of course the person was noteworthy; they are an author or have a ton of followers on YouTube, it must be the anti-skeptics who are deleting the pages." One video I've had drawn to my attention was from a TEDx talk where the speaker was talking about the bias on Wikipedia. She recounted the story of a man who tried to correct information on his own Wikipedia page and was told he was not allowed to do that. When the lecturer stated that Wikipedia did not consider the man to be an expert on himself, she got a nice laugh from the audience and lots of agreement that there must be a conspiracy.

So allow me to set the record straight. First off, Wikipedia is an online encyclopedia that is trying to be the repository of all knowledge; it is not Tumbler or Reddit or some other social network.

Single-purpose editors are not trying to improve Wikipedia content as a whole; they are typically trying to push one specific agenda.

Wikipedia has rules. Some of them are open to interpretation a bit, but for the most part the rules are discussed within the community of editors and usually enforced evenly.

There is no "they" on Wikipedia, only a "we." There are a few admins and senior editors who usually have the last word on an issue, but more often rules are enforced by consensus. The idea of a conspiracy of people who edit with an agenda (pro-skeptic or otherwise) is just unwarranted.

We hear a lot about editors having a bias. Most people who edit Wikipedia are interested in specific topics: butterfly enthusiasts, for example, edit pages about butterflies. It's just human nature to want to work on pages that interest you. There is nothing wrong with that, but a problem arises when someone comes to Wikipedia with the idea that they are going to work on one specific page to the exclusion of all others. These are known as "single-purpose editors," and I see it a lot on controversial pages. These people are not trying to improve Wikipedia content as a whole; they are typically trying to push one specific agenda.

Furthermore, you do not own a Wikipedia page; even if you spent weeks researching every detail for fairness and accuracy, once you publish the page and it's live, it's fair game. Anyone can make edits. Large changes should be discussed on the talk page first, but you have no recourse once it is determined that changes should be made.

Let's next break down the story I mentioned earlier, about the man who tried to edit his own Wikipedia page and was told he was not allowed to make the changes. What most people do not realize is that even if your name is on the title of the page, *it is not your page*. It is a page *about* you, but you are very biased and should not make changes. If there is a problem with factual information, you can make a comment on the "talk page" asking for the

change to be made and giving strong reasons along with a citation to substantiate the change. Wikipedia editors don't run background checks on other editors. How do they know that you are who you say you are? It's easy to make a username, and just as easy to pretend you are someone you are not.

Controversial pages such as astronomy, scientology, evolution, and homeopathy are not pages for a beginner editor. You should first learn the rules, make edits on less controversial pages, and prove to other editors that you are trying to improve Wikipedia in general not just a specific page. The changes you are trying to make might be legitimate changes, but if you barge in with an aggressive attitude, then yes, people are going to be a little worried about your changes. If you have something important to add or change on a controversial page, then go to the "talk page" that exists behind every entry and start a discussion. Better yet, read through past discussions, as it's likely that your suggestion has already been discussed and a consensus has been agreed on.

We see trolls and well-meaning editors vandalize Wikipedia all the time. Changing a psychic's page to say "alleged" is considered vandalism. Adding *South Park*'s epithet "The Biggest Douche in the Galaxy" to John Edward's page is also vandalism. The *South Park* show referring to Edward is already mentioned on the Wikipedia page about him, so it does not need to be added again.

One woman who had just attended the Reason Rally contacted me several years ago. From the hotel room the next day she had attempted to edit the brand new Reason Rally Wikipedia page. What people don't realize is that editors rarely use primary sources. Instead we rely on notable secondary sources. Since it had only been one day, the only noteworthy secondary sources to come out were from Christian reporters writing in Christian news outlets. Of course their coverage was biased by their point of view. They reported on how they were being harassed by the atheists, the importance of their involvement handing out free water, and how mean-spirited the signs were the atheists were carrying. She was so incensed that she stormed in and made accusations and deleted content without discussion. She was banned, and probably rightly so. I did look at the page and was able to calmly clean it up. By that time, more neutral secondary sources had been published in noteworthy places, which made it much easier to fix.

You should first learn the rules, make edits on less controversial pages, and prove to other editors that you are trying to improve Wikipedia in general not just a specific page.

Recently, another person approached me wondering why he was having so much trouble adding content to a page he was working on. I started looking at the history of the page and found that "IdoWhatIWant" was working on only one specific page and nowhere else on Wikipedia. (Not only can you see every edit made on a specific page, you can also see every edit that username has ever made.) It turns out that he was getting some push-back from other editors. We had a long chat; I suggested a few changes to his editing patterns and how to talk to other editors. He laughed and said it had not occurred to him that he had looked like the aggressor and was editing like a troll. He has since written me again saying that he had taken my advice and had finished the page calmly.

The rules apply equally to the paranormal and the skeptic communities. This is not a game or a joke. Wikipedia is too important for people not to take seriously. First learn to edit and start on non-confrontational pages. Improve pages by fixing grammar and spelling. Work on many topics, which shows the editing community that you are there to help. Create a username that does not show your bias: handles like "Chopraisaidiot" and "TeamRandi" shout to the world that you are a skeptic and are needlessly confrontational.

Wikipedia is the sixth-most viewed website in the world. It is the closest thing we have to a repository of all knowledge. In my opinion, it is extremely important to make sure that content concerning scientific skepticism is accurate and well-cited. When people are looking for reliable answers to their questions about paranormal topics or are trying to determine the competency of a specific person, it is most likely they will turn to Wikipedia. It is our responsibility to make sure the answers they are getting are the closest we can get to being accurate. This is the goal of the Guerrilla Skepticism on Wikipedia project. You do not have to join our team to improve Wikipedia content; anyone can edit. Instructions on how to do so are all over the Internet. If you like working on projects with other like-minded people and would like hands-on training, GSoW might be the best solution for you. Write to us at GSoWteam@gmail.com. ■

Susan Gerbic is the cofounder of the Monterey County Skeptics and leader of the Guerrilla Skepticism on Wikipedia project. You can learn more at SusanGerbic.com.

Correlations: How Do We Ever Establish Definite Causation?

EDITOR'S NOTE: We thought the following question from a reader interesting and important enough to provide a response. We asked Morton E. Tavel, MD, author of the lead article in our recent special medical misinformation issue, to answer.

Q: I have read several times in previous issues and in the medical misinformation issue that "correlation is not causation." As a student skeptic, I am perplexed about why so much health research is done in the correlation realm, and it seems to me that much of the health advice given by both alternative medicine and western medicine (science-based we would hope) derives from correlation studies. If my sense of this is true, how do we as the public ever know when there is a definite causation and that we should certainly follow the advice? Or are there actually times when the correlation evidence is so compelling that it should be seriously considered? Headline-grabbing correlation studies can be very seductive. Some guidance here would be helpful.

Thanks for all the excellent work.

Jim Jackson
W. Townshend, Vermont

A: The questions raised by "correlation is not causation" are of enormous importance. In the attempt to determine underlying causes of any outcome, we often necessarily begin by studying an entire population for disproportionately prevalent factors, such as an environmental exposure associated with those individuals suffering from a given illness. Media reports constantly bombard us with the purported dangers of exposure to noxious outside forces, from radio waves to cell phones to all sorts of chemicals. Statisticians and epidemiologists can inform us there may be a significant correlation between an environmental exposure and a given disease, but does that mean the environmental event is the cause? Are there rules that can help us determine whether a given preceding event may actually be the cause?

To demonstrate, let's explore the relationship between cigarette smoking and lung cancer: We begin by observing that cigarette smokers in high numbers succumb to lung cancer. Applying simple statistical methods, we note that this high incidence of cancer cannot be explained simply by chance alone, thus establishing a "correlation." But what can we then conclude? Does the smoking itself cause the cancer? Or are there other independent factors in smokers linked to cancer? Perhaps a physical or genetic predilection to cancer also causes one to desire cigarettes. Or perhaps the actual presence of cancer produces the desire to smoke. In these latter two instances, even though there is correlation between smoking and cancer, it does not prove the smoking itself is the underlying cause of the malignancy.

Ideally we could answer such questions of causation by designing a rigorous prospective scientific study: For instance, we could take a few hundred non-smokers and divide them equally and randomly into two groups. One group is instructed to begin smoking and the other to remain smoke free. After perhaps a twenty-year period of observation, we would compare the rates of cancer in each group to form definite conclusions. But this form of proof is, for obvious reasons, not only impossible but ludicrous!

How Do We Proceed in the 'Real World'?

Environmental questions noted above are difficult because proof of cause is seldom available. In a classic report, Hill (1965) presented guidelines for assessing likely causation. He pointed out the following:

> There are, of course, instances in which we can reasonably answer these questions [about cause and effect] from the general body of medical knowledge. A particular, and perhaps extreme, physical environment cannot fail to be harmful; a particular chemical is known to be toxic to man and therefore suspect on the factory floor. Sometimes, alternatively, we may be able to consider what might a particular environment do to man, and then see whether such consequences are indeed to be found. But more often than not we have no such guidance, no such means of proceeding; more often than not we are dependent upon our observation and enumeration of defined events for which we then seek antecedents. In other words we see that the event B is associated with the environmental feature A,

> that, to take a specific example, some form of respiratory illness is associated with a dust in the environment. In what circumstances can we pass from this observed association to a verdict of causation? Upon what basis should we proceed to do so?

Hill then presented a series of guidelines; the major ones are listed below in order of importance. Again, we refer to the example of cigarettes and cancer:

1. Strength of association—the degree to which a certain disease is increased following a given exposure. Hill noted that prospective inquiries established the death rate from lung cancer in cigarette smokers was nine to ten times the rate in non-smokers, and the rate in heavy smokers was twenty to thirty times that of the base value. This would be considered a strong association as opposed to a twofold rise in incidence.

2. Consistency of association—whether the association has been repeatedly observed by different persons and in different places, circumstances, and times. The relationship between smoking and cancer is the same in hundreds of studies derived from a wide variety of situations and techniques. Repeated exposure to smoke in non-smokers also increases their risk of cancer.

3. Specificity of association—whether a specific disease is related to a single type of exposure. Even though exposure to cigarette smoking is associated with other maladies, most notably cardiovascular disease, it is by far best correlated specifically with lung cancer. And although lung cancer occurs in individuals lacking such exposure, it is quite rare.

4. Temporal relationship of association—whether the unfavorable outcome follows the suspected noxious culprit. Which is the cart and which is the horse? A rather far-fetched example of this would be to ask whether smoking preceded the onset of cancer, or was smoking taken up as an inexplicable reaction to an already established cancerous condition.

5. Biologic gradient—whether there is a *dose-response curve*. As implied in example 1, the death rate from lung cancer rises linearly with the number of cigarettes smoked daily. This fact, in itself, is quite incriminating.

6. Biologic plausibility and coherence—the existence of other biologic evidence that supports a causal explanation. We know that exposure to agents contained in cigarette smoke can cause cancer in other organs, thus implicating the likelihood of the same effect on the lungs. Cigarette smoke has been associated with cancers in skin, urinary tract, oral and nasal cavity, esophagus, larynx, pancreas, stomach, cervix, and colon, and it is even related to certain types of leukemia. Moreover, cancer can be induced in laboratory animals by exposure to cigarette smoke. However, the argument for biologic plausibility is not always possible because it often depends on the experimental information available in the same era. Thus we may seek and obtain biologic confirmation in the laboratory after the fact.

7. Experimental confirmation—by intervening to eliminate the suspected offender, we can show that the disease in question is prevented or eliminated. Repeated studies have shown that cessation of smoking reduces the rate of cancer.

Hill goes on to recognize that statistical significance between an environmental factor and a given disease does not provide proof of causation. He cites interference by confounding factors such as selection bias or inadequate sample sizes. Finally, he considers what level of evidence might justify preventive actions. He admits, as have many others, that this complex challenge requires the consideration of such issues as the cost of interventions, the likely benefits if preventive measures are successful, and the strength of evidence supporting a causal relationship. In other words, evidence or belief that a causal relationship exists is not itself sufficient to suggest taking action. Conversely, uncertainty about whether there is a causal relationship, or even an association, is not sufficient to suggest action should not be taken. Each circumstance may dictate a different response. Clearly, there are no easy answers.

We cannot escape the overwhelming evidence establishing cigarettes as a cause of lung cancer. Similar evidence, not detailed here, links smoking almost as convincingly to cardiovascular disease. Nevertheless, when bombarded by alleged relationships between other environmental exposures, the reader is cautioned not to accept them without serious skepticism. One must usually insist at least upon confirmation from multiple sources under differing circumstances.

These guidelines, as established by Hill, remain appropriate to this day and can provide us all with a basis for understanding all the allegedly "scientific" information constantly surrounding us daily.

Morton E. Tavel, MD

Reference

Hill, Austin Bradford. 1965. The environment and disease: Association or causation? *Proceedings of the Royal Society of Medicine* 58: 295–300.

Morton E. Tavel, MD, is Clinical Professor Emeritus, Indiana University School of Medicine, and author of *Snake Oil Is Alive and Well*. He wrote "Bias in Reporting of Medical Research: How Dangerous Is It?" in our medical misinformation issue (May/June 2015).

The Case of the Haunting Handprints

JOE NICKELL

The Hand on the Mirror: A True Story of Life Beyond Death, by former *Sacramento Bee* publisher Janis Heaphy Durham, tells how the loss of her husband transformed her from "skeptic" to New Age proselyte. *CBS Sunday Morning* asked me to assess the book's claims and appear on a show segment (which aired April 26, 2015). This is a much more extensive analysis of my findings than what appeared on the show.

***The Hand on the Mirror: A True Story of Life Beyond Death*. By Janis Heaphy Durham. New York: Grand Central Publishing, 2015. ISBN: 978-1-14555-3130-1. 268 pp. Hardcover, $26.00.**

After Heaphy Durham's second husband, Max Besler, died (at 12:44 PM, Saturday, May 8, 2004), she began to encounter mysterious phenomena she believes may have represented "messages" from Max: lights flickering, chimes sounding without apparent wind, a church door slamming, and clocks stopping at the exact time of his death (pp. 36–42). If some of the occurrences may have had mundane explanations, others sounded suspiciously like pranking (a possibility we shall return to).

Handprint Non-Evidence

The phenomenon that gave the book its title was the appearance of an unexplained powdery left-handprint that, Heaphy Durham reports, appeared on the mirror in the bathroom of her house's guest suite (where Max stayed during his illness). The handprint was discovered on Sunday, May 8, 2005—the first anniversary of Max's death—whereupon, says Heaphy Durham, "My reality changed" (1). Interestingly, on the second anniversary of the death, some odd powdery images appeared, "this time in somewhat indistinguishable form"—although one "looked like an angel" (73–74). And just two days before the third anniversary, there appeared another powdery handprint (this time of the right hand) with what "looked as if energy was flowing out of the fingertips" (89–91).

I wondered whether the handprints and the "angels" (little more than smudges) might have been accidental—someone possibly having placed a hand on the glass inadvertently (for example to lean in to look closely at one's image). My fingerprint training[1] suggested that such a latent print might become accidentally developed if someone was a bit heavy handed with a powder puff, and the powder—acting like fingerprint powder—adhered preferentially to the traces of oil and sweat. Tested, however, this possibility proved better as a hypothesis than it did in my actual experiments. But the real problem was the dusty prints having appeared at the time of each death anniversary. Like my hypothesis, that seemed too good to be true.

I approached the images-on-the-mirror phenomena with an open mind, but the old skeptical saying that "Extraordinary claims require extraordinary evidence" prevails, and Heaphy Durham's belief that they were supernatural remains woefully unproved. That on three occasions in as many years she did not take samples of the powdery substance is astonishing. Was it unlike anything known to science? Or was it, for example, perhaps a common brand of bath powder? We will never know, and she will never be able to support her claim.

Likewise, she failed to have forensic photographs taken of the handprints. Her amateur snapshots fail to show friction ridge details that would prove them to be actual handprints (and not, for example, simulations or rubber-glove prints). Moreover, the ridge detail could have shown the features—the *cores* and *deltas* and the *minutiae* (such as *ridge endings* and *bifurcations*)—that allow fingerprint classifi-

cations and identifications to be made. (See Joe Nickell and John F. Fischer. 1999. *Crime Science*, University Press of Kentucky.) Her snapshots also did not show scale.

In short, we might have been able to establish that the handprints were genuine and that they were made by someone we could identify. At least three of the numerous New Age "experts" Heaphy Durham interviewed for her book questioned her evidence (164, 184, 213). One fuzzy thinker even suggested, "Maybe on the anniversaries you are filled with spirit and you somehow produce the effects" (184). Yet she insists, "I knew the powdery images were real even if I wasn't certain what they were" (74).

Mysterious Force?

Why did she not properly preserve the evidence? She says of the first instance, "But I was so stunned, it just didn't occur to me" (5). Well, she had three days to reconsider, and on each of the two other instances she had, respectively, a year and two years to have reflected on her missed opportunity. Yet each time her response was to take largely useless snapshots and wipe the prints away. Why? As I told CBS News' Tracy Smith, I suspect she did not want them tested because she was afraid of what she might learn. It is difficult to come to any other conclusion.

Her immediate reaction to the appearance of the first handprint had been to wonder, "Had someone snuck into the house to play a trick?" And then she called her fourteen-year-old son, Tanner, to the bathroom: "'Look,' I cried out. 'You didn't do this, did you?'" But she convinced herself that "The image was much larger than his hand and shaped differently" (3). However, this handprint and the even "much larger" one left two years later are shaped differently, yet rather than conclude that at least one of them is not Max's—or that handprints can look quite different due to pressure and other factors—she decides the second handprint indicated that "Perhaps, if this was Max, he was changing" (89). Again about three days later, she rubbed off the imprint (91).

In fact, the second handprint looks different from the first in an interesting way. It appears to have been deliberately made to look more mysterious: the hand first being placed flat against the mirror, then the palm lifted, and the fingertips pushed up in a curving gesture as they are lifted off the glass. This adds to the fingertips a tapering extension that teenager Tanner describes as "Like tiny flames from a birthday candle" (90).

If someone *were* pranking, given the nature of the events the motive must have been a well-intentioned one: to give her what she seemed so desperately to want.

Could Tanner have made the images on the mirror? He was at home, or had been at home, prior to each of the three occurrences (3, 73, 89). I wondered at length why the third appearance occurred *two days before* the anniversary of Max's death. I had to consider that the teenager (now seventeen and with a much larger hand than two years before) would be going to school the next day (91). It is unclear whether he would then be at his father's home, but in any event he could have seized an opportunity to make the print, considering, perhaps, that his mother was not expected to find it, in the guest bathroom, until she would be sure to go looking for it two days hence. If someone *were* pranking, given the nature of the events the motive must have been a well-intentioned one: to give her what she seemed so desperately to want.

Other Phenomena

Pranking might best explain some of the other mysterious phenomena. Heaphy Durham writes (apparently without realizing the significance): "After the summer of 2007"—that is, after Tanner went away to college—"no more images appeared, no more lights flickered, and no more clocks stopped at my home in Sacramento. It was over, at least at that location" (93). (On a later occasion when she checked the time on her iPhone, it was the magic time—"12:44 exactly" [235]—but one learns by reading her book that she tends to count the hits and ignore the misses [i.e., engages in confirmation bias]. Moreover, of course an unstopped timepiece, like hers then, will show a given time twice a day, every day—like clockwork.)

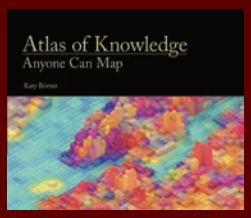
Heaphy Durham is invariably on the lookout for seeming messages from Max, and of course she finds them: a boat named Max, a bridge ditto, and an industrial sign with Max's surname (56–57, 260, 261). She regards the odds for these occurrences as amazing and calls them *synchronicity* (Carl Jung's term for "meaningful" coincidences). In fact, the extraordinariness of the coincidence may be misjudged due to the "selection fallacy." Ruma Falk, in "On Coincidences," Skeptical Inquirer, Winter 1980–81, explains: "Instead of starting by drawing a random sample and then testing for the occurrence of a rare event, we select rare events that happened and find ourselves marveling at their nonrandomness. This is like the archer who first shoots an arrow and then draws the target around it."

Heaphy Durham has also seen apparitions of Max (119, 125) as well as of her dead father (87), but these have occurred just after waking. They are obviously simple hallucinations called "waking dreams" that occur in the state between being fully asleep and awake (see my 2012 book *The Science of Ghosts*, Prometheus Books, 353–354). One such admittedly "dreamlike state" began with her waking into an out-of-body experience in which she then saw Max (118–119).

[NEW AND NOTABLE

Listing does not preclude future review.

KIDS GONE WILD: From Rainbow Parties to Sexting, Understanding the Hype Over Teen Sex. Joel Best and Kathleen A. Bogle. Joel Best, a professor of sociology and criminal justice at the University of Delaware, is perhaps known best to skeptics as the author of several books on statistics, including *Damned Lies and Statistics*; he's also the world's foremost authority on Halloween candy scares and legends. Here he teams up with Kathleen Bogle (associate professor of sociology and criminal justice at La Salle University) to cast a skeptical eye on sensationalized and alarmist accounts of a variety of supposedly common teen activities from sexting to "pregnancy pacts" with their friends to all become teen mothers at the same time. Despite the fact that teen sex and pregnancy rates are at a historic low, these stories have circulated widely and been taken at face value by many concerned parents and social justice organizations. The authors examine these stories in the context of folklore and moral panics about the sexualization of children and explore how these contemporary legends affect society. Combining media literacy with skepticism, this book is a welcome response to an alarmist news media. NYU Press, 2014, 176 pp., $24.95.



ATLAS OF KNOWLEDGE: Anyone Can Map. Katy Börner. The computer age has allowed vast amounts of raw data to be collected; terabytes of information on every conceivable subject are added daily to the Internet and published in journals, newspapers, and elsewhere. But as information becomes available it becomes more and more important to understand that information and assess its significance. Researchers are finding that visual representations of data (charts, graphics, maps, etc.) can be crucial tools for helping people understand complex subjects. With *Atlas of Knowledge*, visualization expert Katy Börner (author of the 2010 book *Atlas of Science*) makes the case for a systems science approach to science and technology studies and explains different types and levels of analysis. Using forty large-scale and more than 100 small-scale full-color maps, Börner introduces a framework to guide readers through user and task analysis; data preparation, analysis, and visualization; visualization deployment; and the interpretation of science maps. She also discusses the effects of science maps on the practice of science. The book is an interesting and innovative tool for skeptics, scientists, and science literacy educators. The MIT Press, 2015, 224 pp., $39.95.

—Benjamin Radford

She also visited psychics and was sometimes impressed with their offerings. She thought she understood the fortune-teller's technique of "cold reading" but was—in my opinion—an easy mark (perhaps significantly, her high school graduating class had voted her "most naïve" [18]). For example, one psychic used the simple expedient of describing a *type* of person and letting the sitter provide an identity: "What I'm feeling is somebody who was in their [*sic*] own little world," and Heaphy Durham obligingly fits this to her late mother (252). One medium came up with "handprints" but only after prompting, being asked if he saw anything "with hands" (207–208).

Almost anything she experienced could become a mystery. A bare footprint on the arm of a sofa (where someone might have stood to reach something) is claimed to have slightly shifted its position during a lapse of forty-eight hours (149–150). However, the two photographs supplied only reveal the simple illusion caused by viewing the print from two sharply different angles. Even one New Age consultant was unconvinced by the report of incrementally moving rugs, suggesting the possibility of floor vibrations (164).

Janis Heaphy Durham has shown how grief can send a vulnerable, impressionable person into the airy reaches of New Age belief, where there is no such thing as death, and where consciousness exists without the brain—as supposedly proved by ghosts, out-of-body experiences, and other illusions.

Hers could be a textbook on how not to proceed. She avoids skeptics; listens only to "scientific" mystics, philosophical mystics, and pretend mystics; and—when evidence suggests she is on a completely wrong track—she resolves "I was not about to give up" (175). "Learning" (i.e., believing) things that are unfounded becomes "expanding my thinking and assisting my growth" (71). Coincidences are interpreted as otherworldly signs and messages, and hallucinatory experiences are held to reveal occult realities. "Why," the Queen remarked to Alice, "sometimes I've believed as many as six impossible things before breakfast." ■

Note

See "Fingerprint Recorder," online at http://www.joenickell.com/FingerprintRecorder/fingerprintrec1.html; accessed April 30, 2015.

Joe Nickell, PhD, is CSI's senior research fellow. He is author of numerous books such as *The Science of Ghosts: Searching for Spirits of the Dead* and coauthor (with John F. Fischer) of the textbook *Crime Science* (University Press of Kentucky).

A Textbook Case in Georgia Remembered

GLENN BRANCH

God Sent Me: A Textbook Case on Evolution vs. Creation. By Jeffrey Selman. Marietta, Georgia: Blossom Press, 2015. ISBN 978-0578152554. 288 pp. Softcover, $17.76.

The year 2015 is the tenth anniversary of the decision in *Kitzmiller v. Dover*, in which a federal court in Pennsylvania ruled that teaching intelligent design creationism in the public schools violates the Establishment Clause of the First Amendment to the Constitution of the United States. But 2015 also marks the tenth anniversary of the decision in *Selman v. Cobb County*, in which a federal court ruled that a disclaimer about evolution affixed inside the science books used in a Georgia public school district similarly violated the First Amendment. In part because the decision was later vacated on appeal and the case was settled before a new trial was held, *Selman v. Cobb County* is not as famous as *Kitzmiller v. Dover*. *God Sent Me*, a memoir by the lead plaintiff in *Selman v. Cobb County*, is a vivid and personal account of the case that helps to rectify its comparative obscurity.

A liberal Jew from the Bronx, a child of the 1960s who marched on Washington, D.C., and served in the VISTA program, Jeffrey Selman moved to Cobb County in the suburbs of Atlanta in 1993, where he became increasingly aware of attempts to impose religious doctrine in the local schools. In March 2002, responding to pressure from a local creationist activist, the Cobb County School Board decided to affix stickers to the science textbooks used in the district reading: "This textbook contains material on evolution. Evolution is a theory, not a fact, regarding the origin of living things. This material should be approached with an open mind, studied carefully, and critically considered." After unsuccessfully voicing his concerns to the board, Selman contacted the ACLU of Georgia and was connected with a lawyer, Michael Manely, who filed the complaint in *Selman v. Cobb County* in August 2002.

The wheels of justice turn slowly, and the trial would not commence until November 2004. In the meantime, Selman received untold numbers of crank calls and letters, was interviewed by local and national media, and spoke at civic organization and board meetings. There was a learning curve here, he ruefully observes: in one interview, he exclaimed, "It's a duck and the emperor is naked!" (p. 91). Part of the activity was due to a further controversy over the board's newly revised policy on "theories of origin"; Selman sent a letter asking for clarification about the policy and received a response that, in its prolix evasiveness, rivals the routine of "Professor" Irwin Corey, the World's Foremost Authority, as Selman aptly observes. Later guidelines clarified the policy, so Manely and Selman decided not to challenge it but to focus only on the disclaimer.

Selman's account of the pre-trial preliminaries is especially interesting, since these are events that were not widely covered by the media. He discloses that the board advanced a settlement offer in which the disclaimers would be retired in six years, when the textbooks would be taken out of commission. He describes the depositions taken in the case, including his own, on the basis not only of the transcripts but also of his attendance; he reveals how, on the eve of the trial, the expert witnesses for the plaintiffs were disqualified from testifying on a "tiny but apparently important technicality," forcing the plaintiffs to reconfigure their strategy so that the expert witnesses would testify as material witnesses instead. "The entire up and down experience of my involvement with the courts was transformative," Selman writes (191).

Eventually, the trial came. A high point occurred when Selman was on the stand undergoing cross-examination. Using a visual aid juxtaposing the disclaimer with the hundred-odd pages of the textbook that discuss evolution in order to minimize the significance of the disclaimer, the defense attorney Linwood Gunn asked Selman, "Viewing this statement in context, is it your testimony that the Cobb County board of education is disparaging evolutionary theory?" "Absolutely," Selman responded. "A small .22 bullet can kill

someone if shot in the heart." It was the perfect riposte. Selman writes of Gunn, "He didn't blink, breathe deeply, or move a muscle, and that's what probably let me know that I had him" (232). It probably impressed the district court judge, too, who in his decision referred to the "overwhelming presence" of the disclaimer.

Subsequently, the school board decided to appeal the decision. It is disappointing that Selman's account of the following events is comparatively undetailed. On May 25, 2006, a three-judge panel of the Eleventh Circuit Court of Appeals vacated the district court's judgment because of concerns about the evidence and remanded the case for further evidential proceedings. Selman accuses the panel of bias but provides no explanation of his reasoning—although it is true that Judge Ed Carnes, who wrote the decision, was (and is) one of the most conservative judges on the court. Similarly, Selman hints that the decision for the appellees to be represented not by their trial lawyer, Michael Manely, but by "attorneys with vast amounts of appeal experience" (presumably Jeffrey Bramlett in particular) was misguided, but again provides no explanation of his reasoning.

Selman also understates the role of *Kitzmiller v. Dover* in forcing the school board to settle. Richard Katskee and Eric Rothschild, who successfully litigated the *Kitzmiller v. Dover* case in 2005, joined the *Selman v. Cobb County* team in 2006 and brought with them two of their expert witnesses—Kenneth R. Miller and Brian Alters—as well as Eugenie C. Scott. Additionally, a host of amicus curiae briefs from scientific, educational, and religious organizations were submitted supporting the plaintiffs. Thus reinforced, and with the *Kitzmiller v. Dover* victory under their belts and available as precedent, the *Selman v. Cobb County* team was ready to pose a formidable challenge in a retrial. Seeing the writing on the wall, the school board caved, signing a broad settlement agreement in December 2006 not to restore the disclaimers, which had already been removed following the original decision.

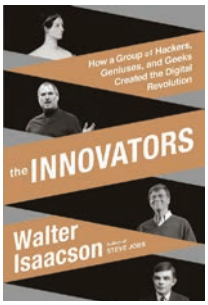
God Sent Me is self-published, and the lack of a firm editorial hand is intermittently detectable. Generally following a straight chronological narrative, Selman's writing is serviceable and often engaging, although there are occasional patches of purple prose: for example at one point he writes, somewhat ridiculously, "The life I was living was in a comfortable but contaminated Petri dish where the leprosy of theocracy was threatening to break out and become epidemic" (17). Fans of Leo Rosten will be amused by Selman's pervasive use of expressions from Yiddish, accompanied by helpful glosses, although "farblondjet" is oddly spelled as "fablunjet" (175). There is no index and no bibliography, and references appear variously in footnotes and in running text, which is mildly frustrating.

Kitzmiller v. Dover was a success: it is increasingly rare for anyone to propose a formal policy that would require or even allow the teaching of creationism—whether biblical creationism, creation science, or intelligent design—in the public schools. As a result, a new wave of antievolution activity, in which policies are proposed to belittle evolution—as "controversial" or as "a theory, not a fact"—is in the ascendancy, and disclaimers like Cobb County's are traditionally a favored way of implementing such policies. *Selman v. Cobb County* was not the first challenge to the constitutionality of evolution disclaimers, but it was the most recent, and the decision in the case was the most compendious. So *God Sent Me* is especially welcome as a timely reminder of the resilience of the antievolution movement and of the necessity of continued vigilance and resistance. ■

Glenn Branch is deputy director of the National Center for Science Education. He recently reviewed Kostas Kampourakis's *Understanding Evolution for The American Biology Teacher.*

World-Changing Genius, Creativity, and Teamwork

KENDRICK FRAZIER



The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution. By Walter Isaacson. Simon and Schuster, 2014. ISBN 978-1-4767-0869-0. 542 pp. Hardcover, $35.

Walter Isaacson's *The Innovators* is his fascinating narrative history of the digital revolution—focusing on the people ("hackers, geniuses, and geeks") who created the digital age we all live in now.

Even more so than in his *Benjamin Franklin* (2003, excerpted in the March/April 2004 Skeptical Inquirer), *Einstein* (2007), and his best-selling *Steve Jobs* (2011), Isaacson here synthesizes huge amounts of published and online material (plus in this case dozens of his own interviews with all the key contemporary figures) in reader-friendly ways and then describes the people and their works in his own vivid, personal style.

The chapter organization is a model of chronological clarity: the computer, programming, the transistor, the microchip, video games, the Internet, the personal computer, software, online, and the Web. This blandly disguises the human drama

contained within. The perhaps surprising hero with which he bookends this elegant work is Ada, Countess of Lovelace (1815–1852), the daughter of Lord Byron. As a self-driven mathematician, she worked with Charles Babbage, envisioned much about the modern computer, and is still revered today. Another hero is Vannevar Bush, who pushed for government-industry-university collaborations after World War II and conceived of a world-brain computer that anticipated the modern networked digital age.

CEO of the Aspen Institute and a former managing editor of *Time*, Isaacson is a master at humanizing whatever topic he writes about. That is especially important dealing with a topic that could, if not handled adroitly, be overly technical and cause eyes to glaze over. In just a few sentences or paragraphs, he vividly reveals what makes each of a hundred or so brilliant contributors to the digital age different and unique.

Isaacson finds ways to bring personalities to life and illuminate the innovators' passions, vision, creativity, and drive. *The Innovators* is scientifically and technologically substantive (his explanation of transistor is one of the clearest I've ever read) and yet highly readable—and that's a rare combination. And he has an uncanny ability to understand and connect all the many technological, historical, and personal strands of the story and weave them into one fine tapestry.

Usually these innovators worked in teams, which proved crucial. From Babbage and Ada Lovelace; to John Mauchly and J. Prosper Eckert and their ENIAC computer (the latter two top Isaacson's list of people who deserve credit for inventing the computer); to John Bardeen and Walter Brattain (transistor, William Shockley being a rare example of a non-team-player); to Gordon Moore, Robert Noyce, and Andy Grove (Intel); Steve Jobs and Steve Wosniak (Apple); Bill Gates, Paul Allen, and Steve Balmer (Microsoft); Larry Page and Sergey Brin (Google); and countless others—over and over the team concept proves essential to bringing new ideas to fruition. ARPANET and the Internet were also designed by collaborative teams. (John Atanasoff had no team with him at Iowa State and therefore his partly electronic digital computer built in the late 1930s never fully worked and, tragically, was left forgotten in a basement storage room.)

Even more important is the necessity of surrounding oneself with colleagues of complementary skills and personalities to bring innovations from idealized concept to actual fruition.

Plenty of individual genius is in evidence in the digital revolution (Alan Turing and John von Neumann are other important examples), but even more important is the necessity of surrounding oneself with colleagues of complementary skills and personalities to bring innovations from idealized concept to actual fruition. Theoreticians need pragmatic engineers; visionaries need detail-oriented managers. Another subtheme is the marriage of science and the arts to make computers and networks usable and interactive and attractive to the human eye and mind. Still another is the demonstrated repeated fruitfulness of focusing on human-computer interactions, combining the strengths of both, in comparison with the less-successful endeavor of artificial intelligence (trying to get computing to mimic or replace human thinking).

For those fascinated with the history of ideas and the human creativity and teamwork required to convert inventions to world-changing innovations, I think you will find, as I did, *The Innovators* a remarkable book. ■

Kendrick Frazier is editor of the SKEPTICAL INQUIRER.

Skeptical Inquirer
DIGITAL EDITION
THE MAGAZINE FOR SCIENCE AND REASON
GET IT ON Google play
Available on the App Store
Subscribe to the digital edition of the SKEPTICAL INQUIRER
and read SI on your iPad, iPhone, or Android device!
Download your FREE sample issue today!
Skeptical Inquirer
Celebrity Scientists
SPECIAL REPORT
Yeti DNA Not a Prehistoric Bear

injuries. Unless before his death Lewis somehow confirmed that all the other soldiers were dead before succumbing to his own wounds, this information makes no sense.

Andrew's parents seem to take this as a sort of confirmation or validation of his story, but as any police detective can attest, that is exactly the wrong way to investigate whether or not a person recognizes photos presented to them. What they should have done is show him a dozen or more photos of various people, some associated with Sgt. Lewis and some not, and asked Andrew, "Do you recognize any of these people?" Better yet, ask Andrew to give the first and last names of his six friends—something Sgt. Lewis would certainly know but the boy would not (unless he'd been coached). There are countless other questions and simple tests that would help determine whether or not the consciousness of a dead Marine inhabits Andrew's mind and body, including presenting the boy with an (unloaded) standard military-issue M16 rifle and asking him how to dismantle and reassemble it.

This is a perfect example of why experienced, skeptical researchers are needed to validate claims such as this. Parents and TV show producers may (or may not) have the child's best interest at heart, but just as nonscientific ghost hunters who use pseudoscientific equipment and poor investigation techniques find bogus "evidence" of ghosts (see, for example, Radford 2010, 113), poor researchers can find bogus "evidence" of past lives.

It's not clear exactly why the Lucases or the TV show settled on Sgt. Val Lewis as the most likely source for Andrew's "memories." Even if the boy were truly experiencing someone else's burning death from a past life, surely there are many thousands of people who might fit the bill or have some connection to an address on Main Street. According to the *Huffington Post*, "How [Michele Lucas] made that connection is a bit of a mini-debate between the participants, according to reporter Barbara Ciara, who interviewed the Lucas family for WTKR-TV. It's not clear whether the show's producers came up with the whole story for Andrew. 'The publicists told me that the family discovered the connection through their own research, but the mom, Michele, told me that the producers came up with it,' she told *HuffPost*" (Moye 2014).

Whatever the source, it's unlikely that this is a hoax or that anyone is trying to fool anyone else. Instead it seems like a mystery created by a series of misunderstandings and faulty investigation. In this case, it seems likely that Andrew's offhanded comments were taken literally and encouraged by his parents and the TV producers. Though it's fodder for reality TV shows, there may be psychological repercussions for the child, who's being told by his parents and other authority figures that the ghost of a dead stranger is in his body and mind—a scary idea for someone of any age. ■

References

Chadwick, Gloria. 1988. *Reincarnation and Your Past-Life Memories*. New York: Gramercy.

Ciara, Barbara. 2014. Scared mother: 'Is there a ghost inside my child?' WTKR News (November 7). Online at http://wtkr.com/2014/11/07/scared-mother-is-there-a-ghost-inside-my-child/.

Edwards, Paul. 1996. *Reincarnation: A Critical Examination.* Buffalo, New York: Prometheus Books.

Moye, David. 2014. Michele Lucas believes her 4-year-old-son is a reincarnated Marine. *The Huffington Post* (November 13). Online at http://www.huffingtonpost.com/2014/11/13/michele-lewis-reincarnation_n_6140052.html?1415905459.

Radford, Benjamin. 2010. *Scientific Paranormal Investigation: How to Solve Unexplained Mysteries.* Corrales, New Mexico: Rhombus Books.

Shroder, Tom. 1999. *Old Souls: The Scientific Evidence for Past Lives.* New York: Simon & Schuster.

Weiss, Brian. 1988. *Many Lives, Many Masters*. New York: Simon & Schuster.

There's much more Skeptical Inquirer available on our website!

Here's just a sample of what you'll find:

Vaccines and the Anti-Vaccination Movement: An Interview with Dr. Paul Offit
In an interview with Lindsay Beyerstein on the *Point of Inquiry* podcast, Dr. Paul Offit spoke about the early 2015 measles outbreak at Disneyland, the anti-vaccination movement, and the importance of vaccination.

Truth, Trouble, and Research Exposing Alt Med
Renowned anomalistic psychology researcher Chris French reviews *A Scientist in Wonderland: A Memoir of Searching for Truth and Finding Trouble*, by Edzard Ernst.

For more online columns, features, and special content, visit **www.csicop.org.**

Medical Misinformation: A Special Issue

The Skeptical Inquirer has outdone itself with the May/June 2015 issue on medical misinformation. Certainly issues regarding medical beliefs and treatment are more important to most of us than haunted houses and folklore critters. The efforts to define science-based medicine in terms of what fits scientific theory and is evidence-based are most enlightening.

When this issue of the Skeptical Inquirer arrived, I was reading on my Kindle *The Complete Short Stories of Mark Twain* and came across his essay, "A Majestic Literary Fossil," in which he describes the change he witnessed in medical viewpoint during the 1800s. He notes the old attitude for centuries was to revere the beliefs of famous ancient doctors and reject novel ideas; the modern medical attitude is to reject the old and favor new ideas. He describes an old medical concoction of many herbs and human and animal body parts similar to the witches brew described in Shakespeare's *Macbeth* and notes that such concoctions combined with bloodletting were more likely to kill than cure the patient. He concludes that the minimalism of homeopathy may have curbed the excesses of allopathy. Perhaps one of the last of these multiherb medicines was Gray's glycerin tonic compound, which my mother used to give us to help recuperate from an illness. I gather that the company founded on producing it hasn't made it in about fifty years and now produces more modern pharmaceuticals.

Although the sale of these multiherb cure-alls may have faded, the promotion of unproven remedies still flourishes. Also with social and political interests pushing for alternative medicine to be treated as equal to science-based medicine in Federal research and Eastern medicine to be treated as equal to Western medicine by the World Health Organization, we have a lot to struggle against.

David W. Briggs
Marion, Massachusetts

I was disappointed in Dr. M.E. Tavel's dismissal of meta-analysis as a scientific endeavor ("Bias in Reporting of Medical Research: How Dangerous Is It?" SI, May/June 2015). Dr. Tavel argues that "so-called" meta-analyses should be distrusted because they rely on the same studies prone to publication bias. Yet his critique overlooks several meta-analytic techniques that assess the potential influence of publication biases within the meta-analysis itself. Furthermore, a thorough meta-analysis includes a comprehensive approach to literature location—including "grey" literature (unpublished studies or those published outside traditional scholarly journals). While some meta-analyses are published without accounting for grey literature, dismissing meta-analysis as a whole ignores its very useful contributions to scientific endeavors. Meta-analysis determines an estimated effect size (i.e., magnitude of an effect) using all available data. It requires numerous studies on a topic, thus reinforcing replication as an essential component of science. Meta-analysis also shifts attention away from p-values because all studies are entered into analysis, thus the significance of any one finding is rendered meaningless. (See "It's Time for Science-Based Medicine" in the very same issue for a discussion of overreliance on p-values in research.) While no one technique is free from limitations, meta-analysis is a valuable tool in our methodological toolbox to aid in our endeavors to reach sound scientific conclusions.

Nora A. Murphy
Associate Professor and
Associate Chair
Department of Psychology
Loyola Marymount
University
Los Angeles, California

Morton E. Tavel, MD, responds to Nora A. Murphy:

I should begin by stating that I am in basic agreement with Dr. Murphy's comments. By pooling numerous studies on a single doubtful issue, we can improve the accuracy of conclusions, even without resorting to so-called "p values." Also as I indicated, I agree that there are even sophisticated and statistical means to help identify and eliminate substandard studies, thus improving the likelihood that conclusions drawn are really accurate and representative of an overall population. Therefore, in the absence of completely definitive data, I personally often rely heavily on the results of meta-analyses in my attempt to manage patients most effectively. This means that I am not "dismissing as a whole" information gained from meta-analyses, as Dr. Murphy suggests.

Where I disagree, however, is that no matter how rigorously we attempt to eliminate sources of bias, we cannot totally account for possible research protocol violations and publication biases as sources of skewing of findings derived from multiple original studies. As a result, we must always remain skeptical of conclusions based upon meta-analyses that combine originals, especially when conclusions appear to run counter to biologic plausibility. For instance, as I presented in the example of acupuncture, the issue of confounders surrounding this latter subject may never allow us to arrive at firm conclusions, leaving the entire public and medical profession in doubt regarding whether acupuncture provides anything more than an elaborate and expensive placebo (as I believe). In this instance, mere acceptance of a meta-analysis does anything but clarify this issue!

Your recent issue on medical misinformation was interesting. You may be interested to know that the Chinese government is looking into traditional Chinese medicine. They have, in fact, set aside $1.7 trillion for research to get a better understanding as to what works and what doesn't. One of the most recent bits of research was into what is considered the "immortality" herb: Tian Shan Xue Lian (Herba Saussurae Involucratae). It has been used for centuries to relieve "heart flutter" or Atrial Fibrillation (A Fib).

What research has found is that the flavome acacetin, which is in this flower as well as in other herbs and even honey, is what has a strong effect on A Fib. Recent research in the United States has shown that acacetin can cause apoptosis in certain types of cancer cells (especially breast and prostate cancers). More research is being done on this molecule.

I thought the article "Bias in Reporting of Medical Research: How Dangerous Is It?" was quite interesting. Bias in scientific research itself is a problem. But in medical research it can be seen in drug companies wanting to get a drug on the market before all of the "bugs" have been worked out. How often is it found out that the mathematics is incorrect when researching something (e.g., the effect of prayer on healing). It seems the initial process of drug testing is Drug 1.0 and its release to the public is Drug 2.0 with the public working out the "bugs." Hence bias can, in many instances, be dangerous. It can lead to misdirection and improper outcomes.

Alex Holub
alxndr01@hotmail.com

*Two articles in our medical misinformation issue explicitly reported on the Chinese government's aggressive promotion in the West of traditional Chinese medicine ("WHO's Strategy on Traditional and Complementary Medicine" and "*Science *Sells Out: Advertising Traditional Chinese Medicine in Three Supplements"). —*Ed.

In "Vaccines and the Anti-Vaccination Movement: An Interview with Dr. Paul Offit" by Lindsay Beyerstein (May/June 2015), the National Vaccine Information Center (NVIC) was characterized as one of "the biggest players in the anti-vaccine movement now."

According to the NVIC website, the organization's mission includes ". . . the prevention of vaccine injuries and deaths through public education and to defending the informed consent ethic in medicine." And, they ". . . support the availability of all preventive health care options, including vaccines, and the right of consumers to make educated, voluntary health care choices."

Characterizing NVIC as "anti-vaccine" might be useful for argument's sake. They do advocate for those of us who want a voice about vaccine choice. However, educating the public that vaccines have risks, and that vaccines [should] be made safer, is not the same as opposing vaccine use.

Vaccine injuries are real. I was injured by employer-mandated flu vaccines in 2009. I still suffer significant effects, despite the flu vaccines being deemed "safe." Medical exemptions are not enough to protect individuals from unwanted procedures. No physician I know could have predicted my immune system would have reacted in the way it did.

Demanding the right to informed consent without coercion, and advocating for safer, more effective vaccines will be needed until we better understand the mechanisms of vaccine injuries and can design vaccine technologies to prevent them.

Daniel Boyle
Evanston, Illinois

Dr. Paul Offit responds:

The National Vaccine Information Center can reasonably be labeled as anti-vaccine because they promote misinformation about vaccines that might cause parents to make bad decisions for their children that could result in harm. Despite NVIC's claims to the contrary, vaccines don't cause autism, multiple sclerosis, asthma, allergies, diabetes, or a variety of other chronic diseases. Although vaccines certainly have side effects, NVIC's exaggerated claims of harm have done virtually nothing to advance the argument for better, safer vaccines. As such, it is a stretch to label them as advocates for safer vaccines when their claims of harm have nothing to do with vaccines.

Overall, the interview of Paul Offit by Lindsay Beyerstein was very good, but I question the assumption in Ms. Beyerstein's comment, "There are people who recruit their children to be suicide bombers." I doubt if that is supported by any evidence. Is there any? It seems far more likely to me that the people who arrange for children to become suicide bombers actually recruit other peoples' children rather than their own. Of course, the Middle East also seems to have a general cultural attitude that devalues women, and in some cases encourages multiple wives and many children. I can see why having a large family would detract from the parent's ability to provide individual attention and could result in encouraging one of many to become a suicide bomber.

Of course, Ms. Beyerstein's use of "their children" could simply mean children who happen to be available in their village or city, or who are being raised in the same religion, rather than their own biological children.

Do a lot of people put their own children at risk for religion? In general, I think people think that they are protecting their children by encouraging them to be religious. After all, many religions promise a glorious afterlife only if their practitioners remain in the faith. Some religions punish members who leave the faith with ostracism. When religion considers our mortal lives to be but a brief preparation for what is to come after death, and apostasy is punished with eternal torment, an early death for a child who dies as a result of religious practice probably doesn't seem all that terrible. After all, they will all be reunited in heaven—they believe.

Carol Mathews
Redwood City, California

Pesticide Myths

For "Myth" 3 in her article "Pesticides: Just How Bad Are They?" (May/June 2015), Harriet Hall states, ". . . 99.99 percent of all the pesticides in our diet are natural components of the food. . . ." (By volume? By weight? By molecular count? By list entry count?) "Any synthetic pesticide residue is a drop in the bucket compared to the much larger concentrations of natural plant pesticides." And yet the agriculture industry finds this 0.01 percent essential for maximizing crop yields? How about we argue that since they're only 0.01 percent, we just leave them out altogether?

Further on, Hall cites a study claiming ". . . total mortality has been found to be consistently lower among pesticide manufacturers. . . ." (This reminds me of the arguments in favor of attending church regularly.) What are we to conclude from this? Could the safety precautions imposed in the workplace to limit exposure to the pesticides be so frightening to the workers that they insist on organic foods at home? "Further study is indicated."

Then, ". . . evolution has equipped the human body to thrive while eating foods with levels of natural pesticides several orders of magnitude greater than the levels of artificial pesticides in today's foods." Fine. I'll cast my lot with the natural pesticides that evolution has conditioned my body to handle.

Wayne Orlicki
Murrieta, California

The May/June 2015 issue of Skeptical Inquirer read like an advertisement for the chemical industry. As an environmental chemist, I have seen numerous cases of real, quantifiable problems caused by the misuse of chemistry, damaging people and the environment. On the other hand, I've also had to confront people's unfounded fear and misbelief. Skeptics and their opponents, true believers, exist in equilibrium. There is a psychological equivalent to Chatlier's principle, where a system in chemical equilibrium, when disturbed from that equilibrium, pushes back to re-establish the equilibrium. Skeptics, when confronted with misbelief, often over-react to that misbelief. The complete skeptic needs to be skeptical of the biases inherent in skepticism.

David Weber
Paonia, Colorado

Harriet Hall, MD, responds:

Orlicki asks about the 99.99 percent of pesticides in our diet that are natural. He could have answered his own question by consulting the reference provided in the article. The 99.99 percent figure is by weight. The synthetic pesticide residue of 0.01 percent in our food doesn't mean we can "just leave them out altogether." It says nothing about the usefulness of pesticides in agriculture, where they obviously increase crop yields by far more than 0.01 percent. The quotation from the study about the health of workers exposed to pesticides explains that it is likely due to the "healthy worker effect" and is seen worldwide. The point is that if pesticides were as bad as Leu thinks they are, we would expect to see a higher mortality among workers, and we don't.

Evolution made us adaptable.

It equipped our bodies to defend themselves not just against the natural pesticides our ancestors had already been exposed to, but against new ones not previously encountered. Defense mechanisms are not targeted to one specific toxin, and the distinction between natural and artificial is a meaningless one. I'll cast my lot with my body's ability to protect against toxins in general, especially considering that pesticide residues in food are 1,000 times less than the lowest levels ever shown to have a harmful effect in humans.

I certainly agree with Weber that chemicals can cause harm and that over-concern and under-concern are both to be avoided. But I would argue that skeptics and true believers don't "exist in equilibrium" because positions based on evidence and positions based on belief can never be weighed on the same scale. I don't think there are any "biases inherent in skepticism." Good skeptics and good scientists are "biased" only in favor of scientific evidence, reality, and critical thinking. There is no bias involved in asking for adequate evidence before accepting a claim.

Among the pseudoscience in medicine, the website Natural News: Nature Health News & Self-Reliance (http://www.naturalnews.com/) is way out there. I find it highly entertaining, to say the least.

I was amazed when I read today in my mail that the vaccination industry is on its last legs, gasping for breath, as if in a short while vaccines will disappear. I suppose if you print enough outrageous stories long enough, eventually out of pure luck you will hit the target and get one right.

Daniel Barker
Lakeland, Florida

Book's Big Error

In your March/April 2015 edition you published a very positive review of Christine Kenneally's book *The Invisible History of the Human Race*, which called it a ". . . must read . . . astonishing and necessary interdisciplinary book." After reading the book I emailed the publishers:

> I bought Christine Kenneally's book *The Invisible History of the Human Race* (Viking Penguin, 2014) after reading a very positive review of it in Skeptical Inquirer (March/April 2015).
>
> In the last paragraph of page 301 of the book is the following statement: "There was much controversy in recent years when it was announced that a Pakistani community of two million people in Bradford, England, had a one-hundred-times greater frequency of genetic disease than the general population."
>
> You might be interested to know that the population of Bradford at the last census was, according to Wikipedia, http://en.wikipedia.org/wiki/Bradford, 522,452 of whom Asian and Asian British, accounted for 26.8%, i.e., 140,149 people.
>
> When I first read this I assumed that the statement was a spin-off from the recent furore about a so-called terrorist expert who, on Fox News, made a series of ludicrous assertions about immigrant populations in England; but no, that was (or rather wasn't) Birmingham.
>
> The origin of Ms. Kenneally's assertion is unclear; there are no footnotes as such, but a note referring to p. 302 suggests that it might have come from the author's interview with (Prof) Alan Bittles. Whatever its origin it would appear that, if it actually has any truth at all, the size of the population described has been exaggerated by a factor of a hundred, if not a thousand, an error which, on a topic which is becoming ever more politically sensitive, should never have been allowed to slip through the book publisher's editing process.

I am disappointed to have received not even an acknowledgement.

Geoffrey Taunton
Montmorillon, France

Why Belief?

Having just recently re-subscribed to SI, I missed Gary Bakker's article "Why Do People Believe in Gods?" (January/February 2015), but I read the Letters section of May/June 2015 in which some of your readers responded to the article. All of those letters were written by people who are obviously intelligent, literate, articulate, all of whom have labyrinthine speculations about something that is fundamentally simple.

As a person approaching the end of life who has rejected the absurdities of religion, I can say that my fear of death is based on the apprehension that my "consciousness," as I understand it, will cease to exist, possibly for eternity. Even though I can't imagine any unpleasantness about it (I won't even be aware that I'm not aware), contemplating it from this side is a real bummer (a word left over from the days of my feckless youth).

Human beings are the only creatures on Earth (as far as we know) who know that life is temporary and brief. You may construct elaborate theories and brace them with convoluted and erudite language, but it isn't that hard to understand. Most people who are forced to confront the imminence of death are afraid. In desperation, to assuage the misery of that certainty, religions are invented, with the promise of eternal life. And that's why people "believe" in gods.

Too simple? I don't think so.

Gene White
Santa Fe, New Mexico

I have a comment on the article "Would the World Be Better Off without Religion" (SI, July/August 2014). I'm impressed with the amount of research put into this and all your articles, and I'd just like to point out a fun fact. The last citation in the article states ". . . there is no human society where religion is totally absent so we really have never tried this experiment."

That actually isn't true. Have you heard of the Piraha tribe? They have really interesting language and don't have numbers, but most importantly they don't believe in any kind of supernatural power. Anything that can't be seen is meaningless to them and they aren't interested in it. Christian missionaries have tried to convert them for decades with no progress whatsoever. The Piraha actually converted one of the missionaries, Daniel L. Everett, to atheism. He wrote a book about it called *Don't Sleep, There Are Snakes: Life and Language in the Amazonian Jungle*.

Filip Dania
fifidania@gmail.com

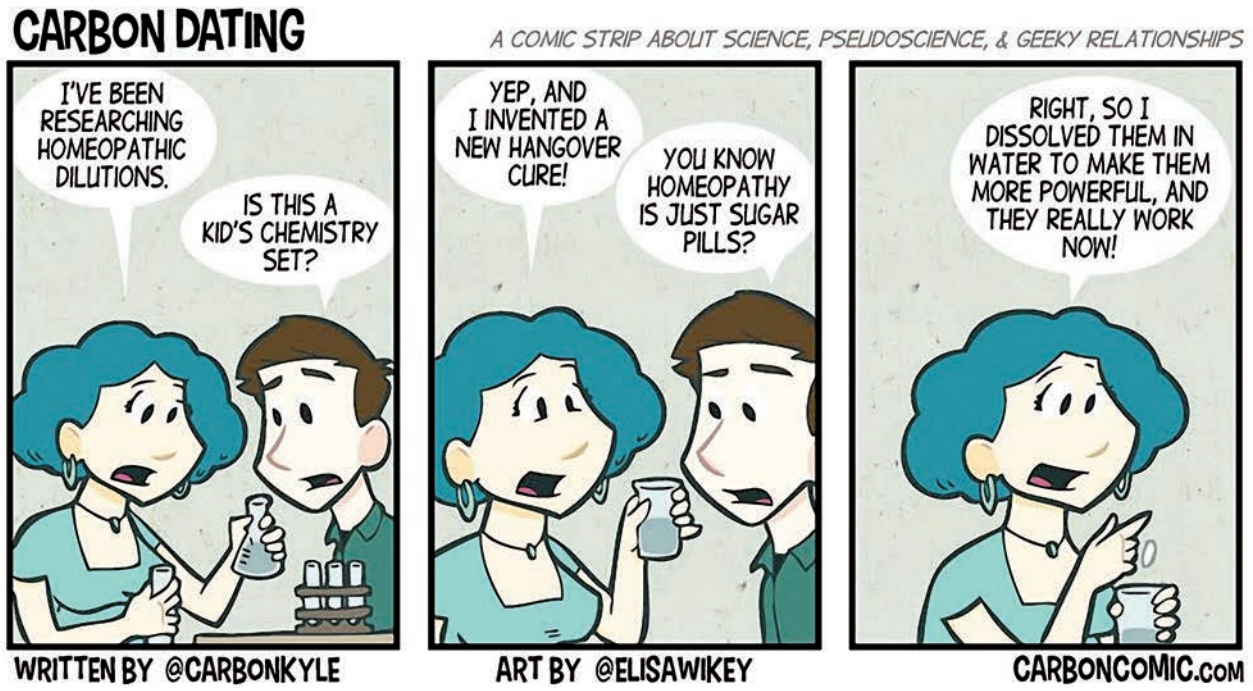
[FEEDBACK

The letters column is a forum on matters raised in previous issues. **Letters should be no longer than 225 words.** Due to the volume of letters we receive, not all can be published. Send letters as email text (not attachments) to letters@csicop.org. In the subject line, provide your surname and informative identification, e.g.: "Smith Letter on Jones evolution article." Include your name and address at the end of the letter. You may also mail your letter to the editor to 944 Deer Dr. NE, Albuquerque, NM 87122.

SKEPTICAL ANNIVERSARIES by Tim Farley

September 3, 1965: A UFO sighting occurs in Exeter, New Hampshire; it is later recounted in the best-selling book *Incident at Exeter*.
September 3, 1975: "Objections to Astrology," an open letter signed by 186 scientists, including eighteen Nobel laureates, is covered in the *New York Times* and other newspapers.
September 16, 1950: An Associated Press story titled "Sea's Puzzles Still Baffle Men In Pushbutton Age" is the earliest published list of Bermuda Triangle-related incidents, though that term would not be coined until 1964.
September 18, 1895: Magnetic healer D.D. Palmer allegedly cures a deaf man, thereby originating the practice of chiropractic.
September 24, 1950: The term *brainwashing* first appears in a news article by Edward Hunter, who also wrote a book on it. It is later revealed that Hunter worked for the U.S. government.
September 28, 1885: Enforced vaccination during a smallpox epidemic leads to anti-vaccine rioting in Montreal, Canada. The fifteen-month disease outbreak took 5,864 lives and disfigured thousands more.
October 1, 1990: Canada issues a set of four stamps depicting the legendary cryptids Sasquatch, Ogopogo, Kraken, and Loup Garou (werewolf).
October 7, 1905: The first installment of "The Great American Fraud" by Samuel Hopkins Adams exposes patent medicines in *Collier's* magazine. The ensuing public reaction leads to the Pure Food and Drug Act of 1906.
October 13, 1990: The first of several alleged Marian apparitions appears in Conyers, Georgia. At their peak, tens of thousands of pilgrims clogged the area around Nancy Fowler's farm on the thirteenth of each month.
October 20, 1975: A television movie about the Betty and Barney Hill abduction titled *The UFO Incident* airs. The claimed Travis Walton abduction (the basis for the *Fire in the Sky* film) occurs two weeks later, and at least one person involved admits to having watched the program.

Tim Farley is the creator of the website whatstheharm.net and blogs at skeptools.com. He is a past fellow of the James Randi Educational Foundation.


CARBON DATING
A COMIC STRIP ABOUT SCIENCE, PSEUDOSCIENCE, & GEEKY RELATIONSHIPS
I'VE BEEN RESEARCHING HOMEOPATHIC DILUTIONS.
IS THIS A KID'S CHEMISTRY SET?
YEP, AND I INVENTED A NEW HANGOVER CURE!
YOU KNOW HOMEOPATHY IS JUST SUGAR PILLS?
RIGHT, SO I DISSOLVED THEM IN WATER TO MAKE THEM MORE POWERFUL, AND THEY REALLY WORK NOW!
WRITTEN BY @CARBONKYLE
ART BY @ELISAWIKEY
CARBONCOMIC.COM

Committee for Skeptical Inquiry

Scientific and Technical Consultants

Gary Bauslaugh,
writer and editor,
Victoria, B.C., Canada

Richard E. Berendzen,
astronomer, Washington, DC

Martin Bridgstock,
senior lecturer, School of Science,
Griffith Univ., Brisbane, Australia

Richard Busch,
magician/mentalist, Pittsburgh, PA

Shawn Carlson,
Society for Amateur Scientists,
East Greenwich, RI

Roger B. Culver,
prof. of astronomy, Colorado State Univ.

Felix Ares de Blas,
prof. of computer science,
Univ. of Basque, San Sebastian, Spain

Nahum J. Duker,
assistant prof. of pathology,
Temple Univ.

Taner Edis,
Division of Science/Physics
Truman State Univ.

Barbara Eisenstadt,
psychologist, educator, clinician,
East Greenbush, NY

William Evans,
prof. of communication,
Center for Creative Media

Bryan Farha,
prof. of behavioral studies in
education, Oklahoma City Univ.

John F. Fischer,
forensic analyst, Orlando, FL

Eileen Gambrill,
prof. of social welfare,
Univ. of California at Berkeley

Luis Alfonso Gámez,
science journalist, Bilbao, Spain

Sylvio Garattini,
director, Mario Negri Pharmacology
Institute, Milan, Italy

Laurie Godfrey,
anthropologist, Univ. of Massachusetts

Gerald Goldin,
mathematician, Rutgers Univ., NJ

Donald Goldsmith,
astronomer; president, Interstellar Media

Alan Hale,
astronomer, Southwest Institute for Space
Research, Alamogordo, NM

Clyde F. Herreid,
prof. of biology, SUNY Buffalo

Sharon Hill,
geologist, writer, researcher, creator and
editor of the *Doubtful News* blog

Michael Hutchinson,
author; Skeptical Inquirer
representative, Europe

Philip A. Ianna,
assoc. prof. of astronomy,
Univ. of Virginia

William Jarvis,
prof. of health promotion and public health,
Loma Linda Univ., School of Public Health

I.W. Kelly,
prof. of psychology, Univ. of Saskatchewan,
Canada

Richard H. Lange,
MD, Mohawk Valley Physician
Health Plan, Schenectady, NY

William M. London,
California State Univ., Los Angeles

Rebecca Long,
nuclear engineer, president of Georgia
Council Against Health Fraud, Atlanta, GA

Thomas R. McDonough,
astrophysicist, Pasadena, CA

James E. McGaha,
astronomer, USAF pilot (ret.)

Joel A. Moskowitz,
director of medical psychiatry, Calabasas
Mental Health Services, Los Angeles

Matthew C. Nisbet,
associate professor of communication
studies, public policy, and urban affairs at
Northeastern University

John W. Patterson,
prof. of materials science and
engineering, Iowa State Univ.

James R. Pomerantz,
prof. of psychology, Rice Univ.

Gary P. Posner,
MD, Tampa, FL

Tim Printy,
amateur astronomer, UFO skeptic, former
Navy nuclear reactor operator/division chief,
Manchester, NH

Daisie Radner,
prof. of philosophy, SUNY Buffalo

Robert H. Romer,
prof. of physics, Amherst College

Karl Sabbagh,
journalist, Richmond, Surrey, England

Robert J. Samp,
assistant prof. of education and
medicine, Univ. of Wisconsin-Madison

Steven D. Schafersman,
asst. prof. of geology, Miami Univ., OH

Chris Scott,
statistician, London, England

Stuart D. Scott Jr.,
associate prof. of anthropology,
SUNY Buffalo

Erwin M. Segal,
prof. of psychology, SUNY Buffalo

Carla Selby,
anthropologist / archaeologist

Steven N. Shore,
prof. of astrophysics, Univ. of Pisa, Italy

Waclaw Szybalski,
professor, McArdle Laboratory, Univ.
of Wisconsin–Madison

Sarah G. Thomason,
prof. of linguistics, Univ. of Pittsburgh, PA

Tim Trachet,
journalist and science writer, honorary
chairman of SKEPP, Belgium

David Willey,
physics instructor, Univ. of Pittsburgh, PA

Affiliated Organizations | United States

ALABAMA

Alabama Skeptics, Alabama. Emory Kimbrough. Tel.: 205-759-2624. 3550 Watermelon Road, Apt. 28A, Northport, AL 35476

ARIZONA

Tucson Skeptics Inc. Tucson, AZ. James McGaha. Email:mcgaha@skepticus.com. 5100 N. Sabino Foothills Dr., Tucson, AZ 85715

Phoenix Area Skeptics Society (PASS) http://phoenixskeptics.org Email: phoenixskeptics@gmail.com

Phoenix Skeptics, Phoenix, AZ. Michael Stackpole, P.O. Box 60333, Phoenix, AZ 85082

CALIFORNIA

Sacramento Organization for Rational Thinking (SORT) Sacramento, CA. Ray Spangenburg, co-founder. Tel.: 916-978-0321; Email: kitray2@comcast.net. PO Box 2215, Carmichael, CA 95609-2215 http://home.comcast.net/~kitray2/site/

Bay Area Skeptics (BAS) San Francisco–Bay Area. Eugenie C. Scott, President. 1218 Miluia St., Berkeley, CA 94709. Email: scott@ncse.com. www.BASkeptics.org

Independent Investigations Group (IIG), Center for Inquiry–Los Angeles, 4773 Hollywood Blvd, Los Angeles, CA 90027. Tel.: 323-666-9797. www.iighq.com

Sacramento Skeptics Society, Sacramento. Terry Sandbek, President. 4300 Auburn Blvd. Suite 206, Sacramento CA 95841. Tel.: 916 489-1774. Email: terry@sandbek.com

San Diego Association for Rational Inquiry (SDARI) President: Tom Pickett. Email: pickett.thomasj@gmail.com. Program/general information 619-421-5844. www.sdari.org. Postal address: PO Box 623, La Jolla, CA 92038-0623

CONNECTICUT

New England Skeptical Society (NESS) New England. Steven Novella M.D., President. Tel.: 203-281-6277; Email: board@theness.com. 64 Cobblestone Dr., Hamden, CT 06518 www.theness.com

D.C./MARYLAND

National Capital Area Skeptics NCAS, Maryland, D.C., Virginia. D.W. "Chip" Denman. Tel.: (240) 670-6227. Email: ncas@ncas.org. PO Box 8461, Silver Spring, MD 20907-8428 http://www.ncas.org

FLORIDA

Tampa Bay Skeptics (TBS) Tampa Bay, Florida. Rick O'Keefe, contact person. Tel.: 813-505-7013; Email: tbs@centerforinquiry.net. c/o O'Keefe, 4011 S. Manhattan Ave. #139, Tampa, FL 33611-1277. www.tampabayskeptics.org

ILLINOIS

Rational Examination Association of Lincoln Land (REALL) Illinois. Bob Ladendorf, Chairman. Tel.: 217-546-3475; Email: chairman@reall.org. PO Box 20302, Springfield, IL 62708 www.reall.org

Chicago Skeptics Jennifer Newport, contact person. Email: chicagoskeptics@gmail.com. www.chicagoskeptics.com

LOUISIANA

Baton Rouge Proponents of Rational Inquiry and Scientific Methods (BR-PRISM) Louisiana. Marge Schroth. Tel.: 225-766-4747. 425 Carriage Way, Baton Rouge, LA 70808

MICHIGAN

Great Lakes Skeptics (GLS) SE Michigan. Lorna J. Simmons, Contact person. Tel.: 734-525-5731; Email: Skeptic31@aol.com. 31710 Cowan Road, Apt. 103, Westland, MI 48185-2366

Tri-Cities Skeptics, Michigan. Dr. Gary Peterson. Tel.: 989-964-4491; e-mail: peterson@svsu.edu. www.tcskeptics.blogspot.com

MINNESOTA

St. Kloud Extraordinary Claim Psychic Teaching Investigating Community (SKEPTIC) St. Cloud, Minnesota. Jerry Mertens. Tel.: 320-255-2138; Email: gmertens@stcloudstate.edu. Jerry Mertens, Psychology Department, 720 4th Ave. S, St. Cloud State Univ., St. Cloud, MN 56301

MISSOURI

Skeptical Society of St. Louis (SSSL) St. Louis, Missouri. Michael Blanford, President. Email: info@skepticalstl.org. 2729 Ann Ave., St. Louis, MO 63104 www.skepticalstl.org

St. Joseph Skeptics
P.O. Box 8908
St. Joseph MO, 64508-8908

NEVADA

Reno Skeptical Society, Inc., Brad Lutts, President. Tel.: (775) 335-5505; Email: info@RenoSkeptics.org. 18124 Wedge Parkway #1052 Reno, Nevada 89511. www.RenoSkeptics.org

NEW MEXICO

New Mexicans for Science and Reason (NMSR) New Mexico. David E. Thomas, President. Tel.: 505-869-9250; Email: nmsrdave@swcp.com. PO Box 1017, Peralta, NM 87042. www.nmsr.org

NEW YORK

New York City Skeptics Michael Feldman, president. PO Box 5122 New York, NY 10185. www.nycskeptics.org

Central New York Skeptics (CNY Skeptics) Syracuse. Lisa Goodlin, President. Tel: (315) 636-6533; Email: info@cnyskeptics.org, cnyskeptics.org PO Box 417, Fayetteville, NY 13066

OHIO

Central Ohioans for Rational Inquiry (CORI) Central Ohio. Charlie Hazlett, President. Tel.: 614-878-2742; Email: charlie@hazlett.net. PO Box 282069, Columbus, OH 43228

Cleveland Skeptics Joshua Hunt, Co-Organizer, www.clevelandskeptics.org

South Shore Skeptics (SSS) Cleveland and counties. Jim Kutz. Tel.: 440 942-5543; Email: jimkutz@earthlink.net. PO Box 5083, Cleveland, OH 44101 www.southshoreskeptics.org

Association for Rational Thought (ART) Cincinnati. Roy Auerbach, president. Tel: (513)-731-2774, Email: raa@cinci.rr.com. PO Box 12896, Cincinnati, OH 45212. www.cincinnati skeptics.org

OREGON

Oregonians for Science and Reason (O4SR) Oregon. Jeanine DeNoma, president. Tel.: (541) 745-5026; Email: wilkinsa@peak.org; 39105 Military Rd., Monmouth, OR 97361. www.04SR.org

PENNSYLVANIA

Philadelphia Association for Critical Thinking (PhACT), Bob Glickman President. 653 Garden Road Glenside PA 19038. 215-885-2089 E-mail: President@phact.org. Website: www.phact.org

TENNESSEE

Rationalists of East Tennessee, East Tennessee. Carl Ledenbecker. Tel.: (865)-982-8687; Email: Aletall@aol.com. 2123 Stonybrook Rd., Louisville, TN 37777

TEXAS

North Texas Skeptics NTS Dallas/Ft Worth area, John Blanton, Secretary. Tel.: (972)-306-3187; Email: skeptic@ntskeptics.org. PO Box 111794, Carrollton, TX 75011-1794. www.ntskeptics.org

VIRGINIA

The James Randi Educational Foundation. James Randi, Director. 2941 Fairview Park Drive, Suite 105 Falls Church, VA 22042 Email: jref@randi.org Telephone: 571-318-6530

Science & Reason, Hampton Rds., Virginia. Lawrence Weinstein, Old Dominion Univ.-Physics Dept., Norfolk, VA 23529

WASHINGTON

Seattle Skeptics
www.seattleskeptics.com

The organizations listed above have aims similar to those of the Committee for Skeptical Inquiry but are independent and autonomous. Representatives of these organizations cannot speak on behalf of CSI. Please send updates to Barry Karr, P.O. Box 703, Amherst NY 14226-0703.
International affiliated organizations listed at www.csicop.org.

CENTERS FOR INQUIRY

www.centerforinquiry.net/about/branches

Transnational
3965 Rensch Road, Amherst, NY 14228
Tel.: (716) 636-4869

Austin
PO Box 202164, Austin, TX 78720-2164
Tel.: (512) 919-4115

Chicago
chicago@centerforinquiry.net

Indianapolis
350 Canal Walk, Suite A, Indianapolis, IN 46202
Tel.: (317) 423-0710

Los Angeles
4773 Hollywood Blvd., Hollywood, CA 90027
Tel.: (323) 666-9797

Michigan
3777 44th Street SE, Grand Rapids, MI 49512
Tel.: (616) 698-2342

New York City
33-29 28th St. Astoria, NY 11106

San Francisco
email: sf@centerforinquiry.net

Tampa Bay
4011 S. Manhattan Ave. #139, Tampa, FL 33611-1277
Tel.: (813) 505-7013

Washington, DC
1020 19th Street., NW, Suite 425
Washington, DC 20036
tel.: (202) 629-2403

Argentina
Buenos Aires, Argentina
alejandroborge@gmail.com
www.cfiargentina.org

Canada
55 Eglinton Ave. East, Suite 307
Toronto, Ontario, M4P 1G8, Canada

China
China Research Institute for Science Popularization,
NO. 86, Xueyuan Nanlu Haidian Dist., Beijing,
100081 China
Tel.: +86-10-62170515

Egypt
44 Gol Gamal St., Agouza, Giza, Egypt

France
Dr. Henri Broch, Universite of Nice, Faculte des
Sciences, Parc Valrose, 06108, Nice cedex 2,
France Tel.: +33-492-07-63-12

Germany
Arheilger Weg 11, 64380 Rossdorf, Germany
Tel.: +49-6154-695023

India
46 Masi garh, New Friends Colony
New Delhi 110025
Tel.: 91-9868010950

London
Conway Hall, 25 Red Lion Square,
London WC1R 4RL, England

Nepal
Humanist Association of Nepal,
PO Box 5284, Kathmandu Nepal
Tel.: +977-1-4413-345

New Zealand
email: bcooke@centerforinquiry.net

Nigeria
PO Box 25269, Mapo, Ibadan, Oyo State, Nigeria
Tel.: +234-2-2313699

Peru
D. Casanova 430, Lima 14, Peru
email: cipsiperu@yahoo.com

Poland
Lokal Biurowy No. 8, 8 Sapiezynska Sr.,
00-215, Warsaw, Poland

Romania
Fundatia Centrul pentru Constiinta Critica
Tel.: (40)-(0)744-67-67-94
email: CenterforInquiry.Romania@gmail.com

Russia
Dr. Valerii A. Kuvakin, 119899 Russia, Moscow,
Vorobevy Gory, Moscow State Univ.,
Philosophy Department

Senegal
PO Box 15376, Dakar – Fann, Senegal
Tel.: +221-501-13-00